Logic MMC, Logic DFC
Libra Live, Post & Music

Service Manual

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Issue 3

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Important Note

Every effort has been made to ensure that the information supplied in this document is accurate. However, no responsibility is taken for inaccuracies, errors or omissions. Neither is any liability assumed for damages resulting either directly or indirectly from use of any information contained within this manual.

This manual is not part of any issue system and will not necessarily contain up to date material.

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✍ *Failure to follow these procedures and recommendations could invalidate the manufacturer's warranty.*

✍ *Please note that modules, cards or cables should not be "hot-plugged" (i.e. inserted or removed with the power on). Hot-plugging can stress the interface components which may lead to failure. Items returned for repair with this kind of damage are not covered under warranty.*

✍ *All front panels must be fitted to the racks to achieve the required cooling. If the rack units are operated with the panels removed overheating will occur and may lead to component failure not covered under warranty.*

✍ *When working on the system please observe the precautions for handling static sensitive devices which are described overleaf.*

Static Sensitive Devices – *Handling Precautions*

Introduction

❑ This Specification details the precautions to be used for the Protection of Semi-Conductor Devices.

❑ Static Charge build up in humans, tools, fixtures etc., could appear as a voltage difference applied between the leads of a device, leaving either immediate or latent damage.

Component and Package Identification from AMS Neve plc

Containers and Packages holding Semi-Conductive Devices will be suitably marked.

Approved containers consist of:

❑ A rigid plastic container lined with conductive foam.

❑ A conductive plastic bag of a size adequate to completely contain the item.

Handling of Static Sensitive Devices

General Precautions

❑ Personnel handling these must not wear outer clothing which will generate a static charge. Cotton or linen is preferred.
Wool frequently contains man made additives. Nylon or man made fibre outer garments or dust coats must not be worn.

❑ Freshly xeroxed/photostat copies can hold a substantial static charge and should be kept well away from static sensitive devices.

❑ All bench surfaces where these devices may be handled must be conductive and maintained at earth potential.

❑ Before removing a device from the protective material personnel must be adequately earthed. The device should not be handled by its leads.

Static Sensitive Devices to be returned to AMS Neve plc

All containers and packages containing Semi-Conductive Devices will be suitably marked with a warning 'STATIC SENSITIVE'.

Approved containers consist of:

❑ A rigid plastic container lined with conductive foam.

❑ A conductive plastic bag of a size adequate to completely contain the item.

System Overview

Architecture

Logic MMC, Logic DFC, Libra Live, Libra Post & Libra Music are a fully automated digital mixing consoles with separate 19" rack units housing the processing and input/output interfaces. Automation is provided by Encore which is an integral part of the system.

The main elements of the systems are:

❑ Console surface

❑ Encore Processor Unit

❑ SPS Rack (signal processing system) containing signal processing and MADI cards (timing and multi-channel serial link) and studio computer system which is the control interface between the desk and the processing. This contains File Server card, Winchester, etc.

❑ MIOS Rack containing:

Mic Input Module - 4 channels each with 2 mic inputs and 1 line input

Line Input Module - 16 channels each with 1 line input

Line Output Module - 16 channels each with 1 line output

AES Input/Output Module - 8 AES inputs and 8 AES outputs

Options

❑ Multichannel AES I/O Unit

❑ Relay Control Unit with remote relays under processor control

❑ Recorder Interface Unit (Logic DFC only)

❑ Remote 8 Channel Level Control Unit

❑ TDIF/MADI Interface Unit

System Interconnection

Transputer links are used for command and control between transputers. Interconnections between boards use small patching cables with either 2 x 3-way link cables or 4-way service connections. All inter-rack connections are made by 25-way 'D'-type connectors and 12-pair low capacitance data cable called 'Tranlinks'. Each Tranlink cable carries four differential transputer links and two services (Reset, Analyze and Error).

Audio between racks is carried on high-speed serial (TAXI) links.

Transputers and Signal Processors

No audio is processed by transputers. These are used solely for command and control functions, in a distributed network locally managing a particular part of the hardware.

Signal processing is carried out on cards known as XSPs each having 32-bit dedicated DSPs. These cards are managed by a transputer which is part of the overall hierarchy, receiving commands from and reporting back to other transputers in the system.

Audio Path

The MIOS Racks form the heart of the audio I/O system and contain digital and analogue interfaces as well as local synchronisation. Master synchronisation and timing for the whole system is generated with the SPS Rack. The MIOS Racks connect to the rest of the system via an industry standard MADI interface.

Transputer Types and Function

The consoles use a mixture of 16 and 32 bit transputers that each use four 20M bit/s serial communication links to form a closely coupled control system. Each of the transputer boards provide RS422 link buffers and the Reset, Analyze and Error network.

The transputers fall into three categories: T2s, T4s and T8s. These are generic types, each representing various specific devices:

(a) T2

The T2 is a 16-bit processor used mainly for low-level hardware control functions – turning on LEDs, controlling the small DSPs on the TranDSP and TranSync cards etc. They have just under 64K-bytes of memory.

(b) T4

T4s are 32-bit devices used for general-purpose processing, each are provided with 4M bytes of local memory.

(c) T8

T8s are also 32 bit processors but have floating-point co-processors. They are used for more computationally intensive tasks, in particular the calculation of all coefficients for DSP work (fader position, EQ, filters etc.). This is carried out in real time, unlike some systems which use look-up tables. This has the advantage of allowing continuously variable functions, rather than steps. T8s are provided with 4M byte of on-card memory.

The T8 then is used to generate the coefficients and manage the card, but actual signal processing is carried out by the dedicated micro-programmed DSP chips which are specifically designed for the processing of audio and implement multiple hardware paths.

Control Topology

The transputers in the system are linked together into a hierarchical tree structure. The convention is that a link 0 is an "up" link, with links 1, 2 and 3 used as "down" links. The link topology drawings show the structure with the TranSCSI card at the top of the tree, with sub-systems fanning out beneath it. The parent-child relationship is determined by the services connections once the system is booted, any configuration of communication paths can be set up by the software.

Link 3 is seldom used: this is because where possible it is reserved for use as a software diagnostic port.

Links are sent differentially between cards at RS485 levels. It is essential that they are correctly terminated if unused so that noise is not interpreted as valid program data during bootup.

Each processor in a network may be reset by a parent and provide individually-controlled resets to three children. Errors occurring on any child may be detected by its parent. The Analyze control line enables the network of transputers to be halted and its state examined by the development system. Diagnostic LEDs are provided on all boards to show transputer activity and are laid out in a standard form:

Red	Transputer Error
Green	Link 0 Output Activity
Green	Link 1 Output Activity
Green	Link 2 Output Activity
Green	Link 3 Output Activity
Red	Reset

Some cards also have six yellow software-controlled LEDs that give further status information.

Reset and Services

Reset

Reset occurs

(a) at power-up

(b) from the reset switch on the SPS Control Card

(c) clicking the Reset button in the Service Control program (available in the Encore program group)

(d) clicking the Reset button in the Desk Explorer program (available in the Encore program group)

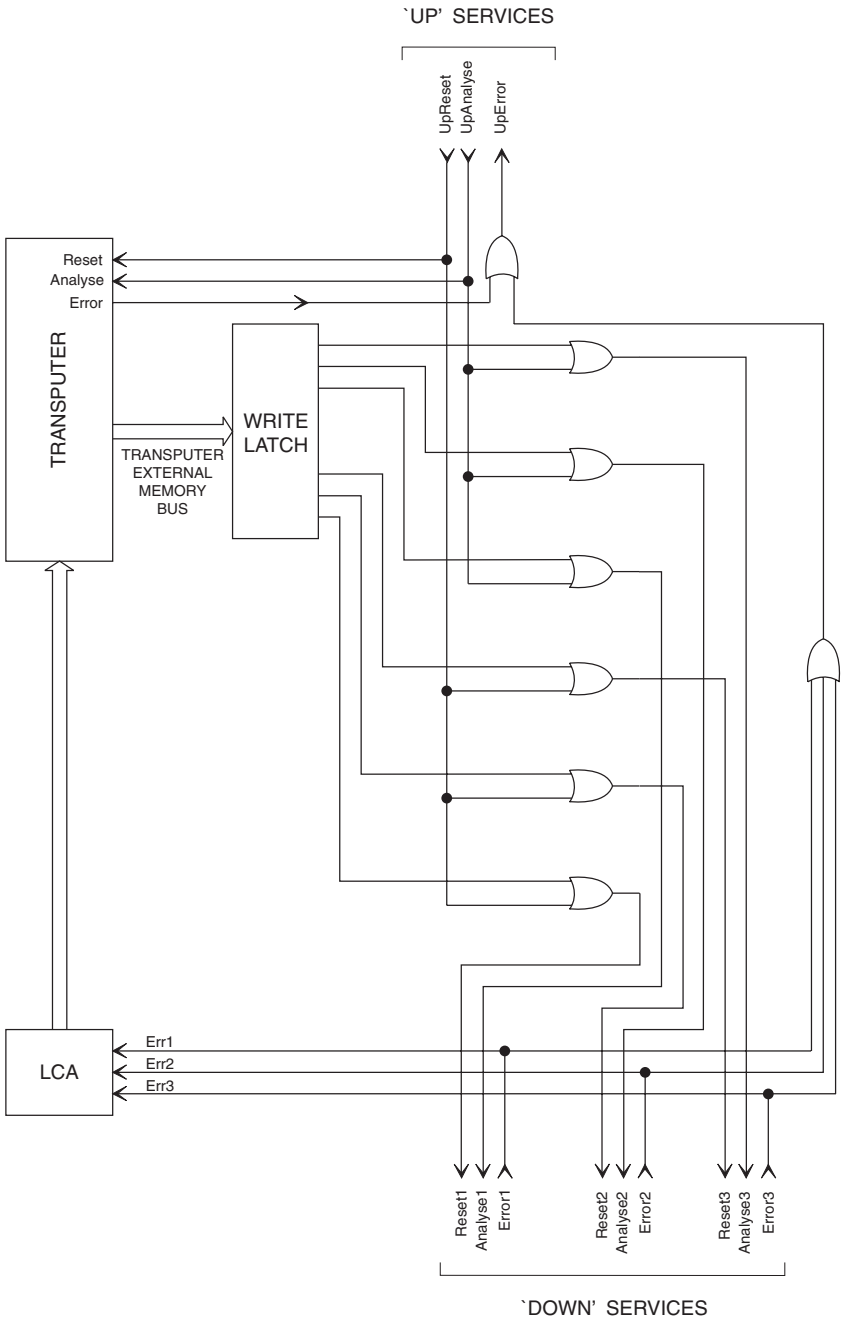
Reset propagation may be checked using the red RST LEDS on each card: the link topology drawings show the propagation of reset through the system.

When a transputer receives a reset signal it assumes the data that follows is its program which it automatically executes. If a link has not been correctly terminated, noise at the differential input may cause incorrect program data to be received and subsequent boot failure. This condition is identified by activity on any of the four green link LEDS immediately after receiving a reset signal. Any such activity must by corrected by ensuring the correct termination plugs are present and that all parts of the system are powered up.

Services

Reset is just one of three "services" connections: the other two are "Analyze" and "Error". The Error signal propagates "up" through the hierarchy notifying higher level transputers of faults on the sub-system, whereas Analyze and Reset flow "down". Analyze is used during system development to halt transputer operation while preserving current status information. Four services connections are provided on each card, each consisting of Reset, Analyze, and Error (RAE). Logic on the card provides one "up" service channel and three "down" channels which normally parallel the links, although there are exceptions.

Transputer Services Logic



On-card logic (external to the transputer itself) is used to drive `up' and `down' service channels. Reset and Analyse signals flowing into the card propagate down to the sub-systems beneath. Also the transputer is able to Reset or Analyse any of its children by means of an addressable latch.

Error signals from children are presented to an LCA array which the host transputer then monitors and if necessary, action is taken. Error signals also propagate up through the 'up' service channel, notifying the card above of an error condition.

Booting the System and Isolating System Faults

The boot sequence can be divided into two main sections

1) Console system boot

2) Encore Automation system boot

Console system boot

System Reset and Link Activity on Reset

A system reset will cause the console to re-start in the same manner as performing a cold boot.

The Transputer Link Topology must be used when fault finding the reset path and Transputer link connections - see Section 1.1.

Boot Sequence

The FileServer area of the SPS control card will be booted.

The FileServer now resets the MCS card, and the Automation and Allocation processors on the SPS control card.

The Allocation processor resets the QuadMADI (slot 1 SPS) and the first XSP (slot 2) in the chain. Each ESP resets the next ESP in turn. The QuadMADI resets the TransyncPLUS and the next QuadMADI in the chain.

The Automation processor resets the System Master Module in the console. This module, in turn, resets the remaining console modules. Progress messages will appear on the console's electronic scribbles showing channel information and mix restoring.

A reset through the system can be visually monitored by observing the RED reset LED immediately to the right (if horizontal) or underneath (if vertical) of the 4 green link LEDS on each transputer cards.

Any break in the reset path can be caused by either;

1) Faulty cable or no cable connection

2) Faulty PCB or module

If a reset has been lost to the next cardframe in the chain then check the Tranlink cable that connects the two 25 way D-types that are involved.

If a visual inspection proves good then a continuity check of the cable can be done also testing for shorts to the D-type shell. If the Tranlink tests OK then the problem may lie with the internal service cable.

If all cables prove to be good then the transputer card transmitting the reset out of the parent cardframe is faulty, (in this case the QuadMADI).

In the event that a reset line within the system needs to be monitored by a scope then attach a probe to the RED connection of the relevant services cable. The signal is normally high going low on reset.

As the system is being reset the user must also observe the link LEDS on each transputer card. None of these LEDS should flash at the point the cards are being reset.

The Link Topology indicates how the link network is constructed. On the transputer network link 0 is always the input to the transputer and link 1, 2 or 3 are outputs. Therefore, link 0 of a particular transputer is usually connected to link 1 of the previous transputer in the chain.

If link activity on reset is observed on the first transputer in a cardframe then, as earlier with the reset path, this can be caused by either the Tranlink cable that connects both card frames or possibly the internal link cables that are involved.

Once the user has established that the system has good PSUs a good continuous reset path and no link activity on any of the transputer cards upon reset we can progress onto the main boot sequence.

Encore Boot Sequence

When the Encore Processor unit is powering up or re-booting, the left hand LCD screen (on 24 and 48 fader systems) will display status messages.

The graphics adaptor card will display its BIOS information.

A CPU and memory check message will be displayed if the system is performing a cold boot.

The system BIOS version will be displayed.

The SCSI controller card will boot and display its BIOS version.

The SCSI controller card will perform a self test and determine which devices are attached to it.

The system will boot the operating system from the first bootable hard disk.

The system is now under the control of the Microsoft Windows NT boot loader.

A menu will be displayed for operating system version selection. Either press Enter or allow the system to time out and select the default.

Microsoft Windows NT will now boot.

➤ Log into the system with an appropriated user name.

✍ *See the User Manual for further information on logging into Encore.*

➤ Double click on the AMS Neve Encore program group icon.

A window will open containing icons representing the Encore programs.

If the console system boot has been completed Encore may be started.

Encore is launched by double clicking on the Encore icon.

The main Encore screen will be displayed.

Booting the Standalone IOS Rack

To successfully boot the standalone IOS rack and for the system to recognise the card count, the following procedure is necessary:

- Power down the SPS rack, the Master IOS rack (if present) and any standalone IOS racks.
- Set the SPS control card (SUN820-200) or TranSCSI card (SUN820-089) to boot from LINK (there is a small switch on the front of the SPS control card, on the TranSCSI card it is dip switch 4 of 4, the one nearest the front of the card).
- Power up all the IOS racks.
- Power up the SPS rack.

Wait until the ADC's in the standalone IOS rack have calibrated i.e. you can hear the relays click.

- Set the SPS control card or TranSCSI card back to boot from ROM.
- Send in a "reset console" via Service Control. (In Flash systems send in an Upgrade Flash, then a normal Flash boot when prompted).
- Open Desk Explorer, connect to the desk and check the recognition of the standalone IOS rack in IOS Runtime Debug (for example "IOS ADC Cards present FFF Port : 0" means port 0 has found 12 ADCs).

Card Descriptions and LED Interpretations

The following pages describe the cards used in each type of rack and their LED interpretations.

Encore Processor Unit Cards

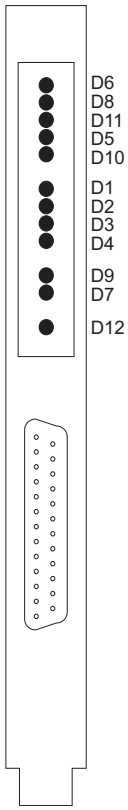
Enhanced Link Adaptor (SUN820-183)

CARD DESCRIPTION

The Enhanced link adapter is a ISA compatible PC card providing four transputer links and services via a 25 way 'D type' connector. The card address is set by a six way DIL switch which corresponds to the I/O address lines A9 to A4. Two IMS C011 link adapters convert the ISA data to Transputer link format. Link data from the first C011 has the option to be routed directly to the connector, or via the optional TRAM module, under software control. The second C011's link data is routed directly to the connector.

The board also supports four general purpose opto-isolated inputs and outputs which are accessed via a 26 way IDC connector. A 10 way IDC connector is used to route six of the on-board LED indicator signals to the Encore PC front panel.

LED INTERPRETATION



D6 (*red*) ON indicates Reset In from Spectra active

D8 (*red*) ON indicates Board Reset active

D11 (*yellow*) ON indicates TRAM Analyze active

D5 (*red*) ON indicates Reset 1 Out active

D10 (*yellow*) ON indicates Analyze 1 Out active

D1 (*green*) ON indicates Link 0 active

D2 (*green*) ON indicates Link 1 active

D3 (*green*) ON indicates Link 2 active

D4 (*green*) ON indicates Link 3 active

D9 (*red*) ON indicates TRAM error

D7 (*red*) ON indicates Error In active

D12 (*yellow*) ON indicates TRAM module enabled

Encore Front Panel Indicator Board (SUN820-194)

DESCRIPTION

The indicator board duplicates some of the LED indication on the Enhanced Link Adapter, in addition to providing a disk activity LED and a recessed RESET switch.

The LEDS are located on the right hand side of the Encore Processor Unit front panel.

LED INTERPRETATION

Left to Right:

(*red*) ON indicates TRAM error

(*green*) ON indicates Link 0 active

(*green*) ON indicates Link 1 active

(*green*) ON indicates Link 2 active

(*green*) ON indicates Link 3 active

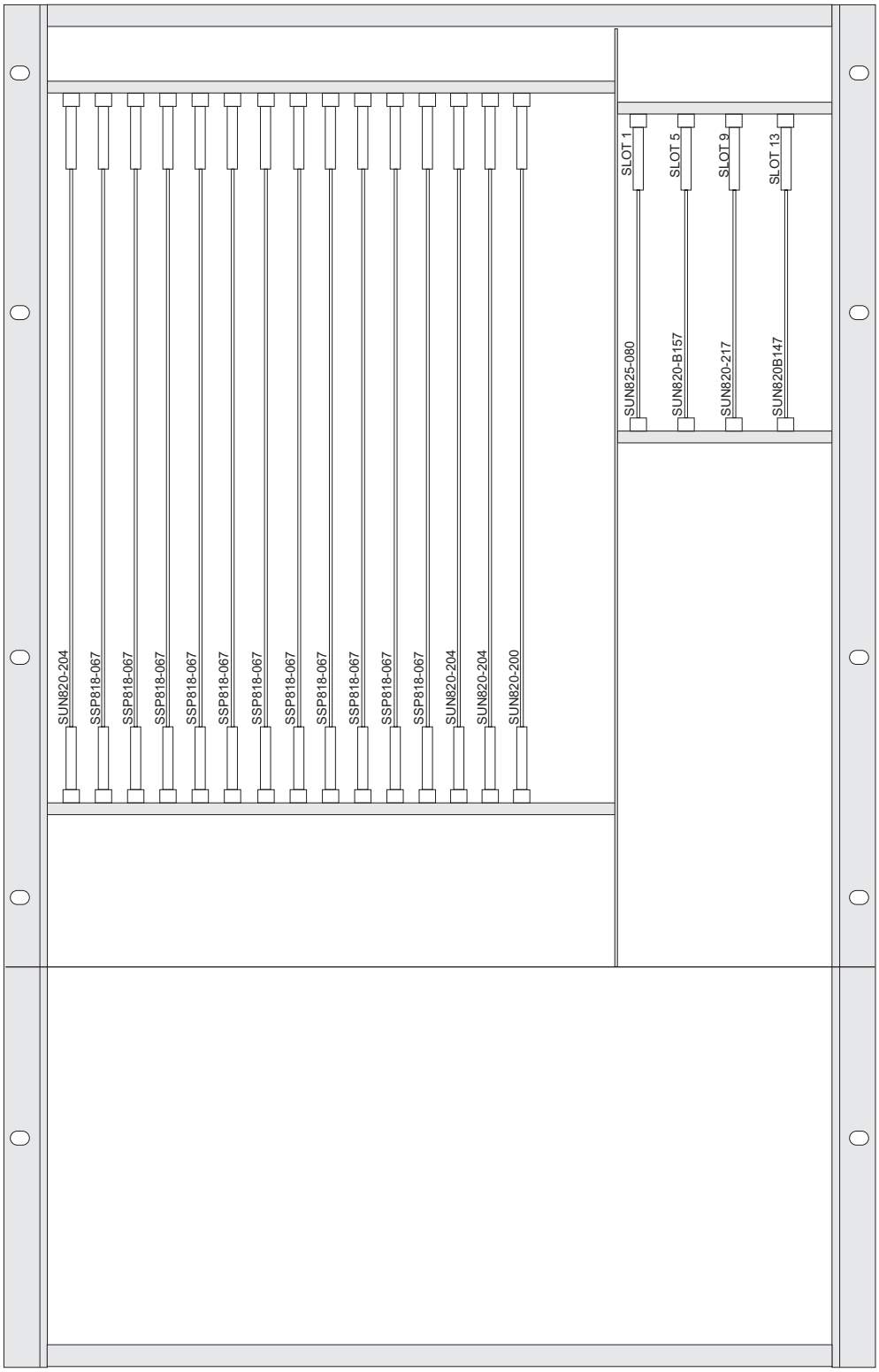
(*red*) ON indicates Reset and/or TRAM analyze active

(*yellow*) ON indicates hard disk activity

(*yellow*) spare

recessed RESET switch

SPS Rack Cards



CARD POPULATION IS CUSTOMER SPECIFIC AND MAY VARY FROM THE EXAMPLE ILLUSTRATED

Processing Cards

SUN820-211	**QuadMADI (Full Delay)**
SUN820A211	**QuadMADI (Quarter Delay)**
SUN820-204	**QuadMADI (ESP) (Full Delay)**
SUN820A204	**QuadMADI (ESP) (Quarter Delay)**
SUN820B204	**QuadMADI (ESP) (Full Delay) - T8**
SUN820C204	**QuadMADI (ESP) (Quarter Delay) - T8**
SSP818-067	**XSP**

Control Cards

SUN820-217	**Trancon**
SUN820B147	**Machine Control Card**
SUN820-200	**SPS Control Card**
SUN820A200	**SPS Control Card**
SUN820B157	**TranSync PLUS**

QuadMADI (SUN820-211 and SUN820A211)

CARD DESCRIPTION

MADI Interfaces : The board provides four MADI/TAXI ports. Each port can be configured as TAXI format to run with AMS Neve equipment. It can also be configured as MADI format to interface with any other MADI equipment such as multitrack tape machines. It is a full implementation of MADI with user bits and channel status.

Delay RAM : The SUN820-211 and SUN820B211 have a total of 20 seconds delay RAM (10 seconds on Rx and 10 seconds on Tx). The SUN820A211 and SUN820C211 have a total of 5 seconds delay RAM. This delay RAM can be allocated freely among the maximum 256 channels which can pass through the card. The maximum delay of a channel is allocated at boot up but the actual delay can be varied from 0 to maximum delay using a control knob on the console.

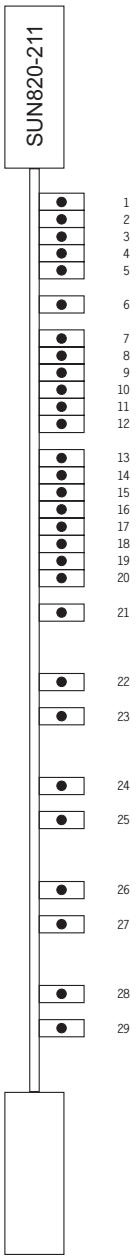
Metering : The SUN820A211 has 2 metering processors on board which allow all the I/O to be metered.

Dithering: All boards have the ability to dither the outputs. The dither options are Rectangular, Triangular, LSB rounding or none with the option to dither to 16, 18, 20 or 24 bit converter length. The type and length can be selected on a channel by channel basis and is set up in the I/O Designer page.

The QuadMADI also generates the master timing in the SPS thus enabling the XSPs to run.

QuadMADI (SUN820-211 and SUN820A211) continued

LED INTERPRETATION



1 (*red*) UpError – If Error is also on then this signifies that the Transputer error originated on this card. If Error is off and UpError is on then the Transputer error came from another card

2, 3, 4, 5 (*green*) Link 0 1 2 3 – Link activity indicators

6 (*green*) Error – Transputer Error light

7 (*red*) Reset – Lights when the card is being reset

8, 9, 10, 11, 12 (*yellow*) Transputer soft LEDS – These have different meanings depending on the stage of the boot sequence. Once the desk is booted the leftmost LED should be ON. The other four come on if the corresponding port is muted (too many errors). The second left represents port 0, third left port I etc.

13, 14, 15, 16, 17, 18, 19, 20 (*yellow*) 96K Soft LEDS – The rightmost two of these LED's should be flashing. If either stop it indicates that one or both of the metering processors has crashed.

21 (*green*) Word Clock OK – If this LED is on it indicates that word clock is present in the rack and that it is of 50/50 mark space ratio and that it lies somewhere between 32K and 54K in frequency. In other words it indicates that the rack has a good quality wordclock.

There are two LEDS for each port that indicate the following

22, 24, 26, 28 (*red*) MADI Error – If this LED is on it means that one or more of the following conditions has been met.
1. the cable is broken causing TAXI violations
2. there are parity errors on the MADI stream
3. the MADI stream does not contain 56 channels

23, 25, 27, 29, (*yellow*) TAXI/MADI mode – This LED indicates what format the port is running;
Off = TAXI mode i.e. it should be connected to an IOS or MTI rack
On = MADI mode which means it is available for external MADI connections (i.e. multitrack)

QuadMADI (ESP) (SUN820-204, A204, B204 and C204)

CARD DESCRIPTION

MADI Interfaces : The board provides four MADI/TAXI ports. Each port can be configured as TAXI format to run with AMS Neve equipment such as an IOS or MTI rack unit. It can also be configured as MADI format to interface with any other MADI equipment such as multitrack tape machines. It is a full implementation of MADI with user bits and channel status.

Delay RAM : The SUN820-204 and SUN820B204 have a total of 20 seconds delay RAM (10 seconds on Rx and 10 seconds on Tx). The SUN820A204 and SUN820C204 have a total of 5 seconds delay RAM. This delay RAM can be allocated freely among the maximum 256 channels which can pass through the card. The maximum delay of a channel is allocated at boot up but the actual delay can be varied from 0 to maximum delay using a control knob on the console.

Metering : The SUN820A204 has 2 metering processors on board which allow all the I/O to be metered.

Dithering: All boards have the ability to dither the outputs. The dither options are Rectangular, Triangular, LSB rounding or none with the option to dither to 16, 18, 20 or 24 bit converter length. The type and length can be selected on a channel by channel basis and is set up in the I/O Designer page.

The QuadMADI also generates the master timing in the SPS thus enabling the ESPs to run.

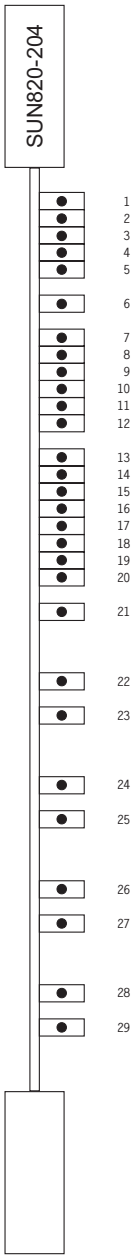
Signal Presence

Each TX and RX Channel can be monitored for signal presence i.e. whether the signal level is above four different levels. These levels are peak (highest level), red, orange and green (lowest level).

These levels are software programmable, which can detect signal levels down to -96dB.

QuadMADI (ESP) (SUN820-204, A204, B204 and C204)

LED INTERPRETATION



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There are two LEDS for each port that indicate the following:

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3. the MADI stream does not contain 56 channels

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Off = TAXI mode i.e. it should be connected to an IOS or MTI rack
On = MADI mode which means it is available for external MADI connections (i.e. multitrack)

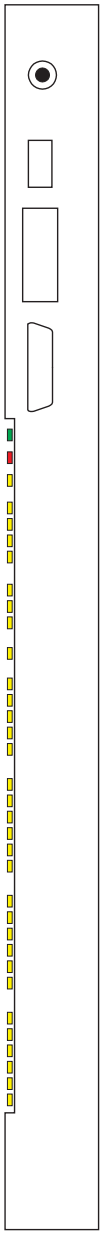
XSP (SSP818-067)

CARD DESCRIPTION

The XSP signal processing card consists of four groups of 32bit floating point DSP devices. Each group has a dedicated coefficient interpolation processor. Three of the groups perform path processing and have two Path Worker processors, the fourth group is dedicated to mix processing and has just one Mix Worker.

To support the processing groups, there are three further DSPs. The Calculator produces and distributes coefficients around the DSP groups. The Worker configures and controls data distribution activities and the Root manages booting and backplane communication to other system elements via a mezzanine site.

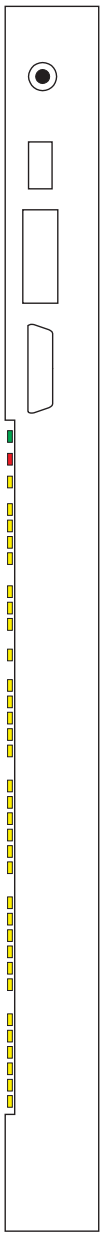
Audio data enters and leaves the card through four 32 bit time division multiplexed, ASIC controlled backplane busses.



LED INTERPRETATION

The front panel LED indicators are arranged along the underside of the front edge of the XSP.

Power	Power Available to XSP
Reset	Card in Reset
Root Processor Flag3	ROOT Sharc running from ROM
Comm Mezzanine 0	ACTEL Link 0 (External Comms)
Comm Mezzanine 1	ACTEL Link 1 (External Comms)
Comm Mezzanine 2	ACTEL Link 2 (External Comms)
Comm Mezzanine 3	ACTEL Link 3 (External Comms)
Worker Flag3	Worker Sharc Link (Internal comms)
Worker LED 0	NOT USED
Worker LED 1	NOT USED
Calc Flag3	Calculator Sharc Link (Internal Comms)
Mix Coefficient Processor Flag3	Mix Coeff Running Flag
Mix Worker Processor Flag3	Mix Worker Running flag
Mix Status 0	NOT USED
Mix Status 1	NOT USED
Mix Status 2	NOT USED



LED INTERPRETATION

Path 0 Coefficient Processor Flag3	Path Coeff Running flag
Path 0 Worker 0 Processor Flag3	Path Worker Running flag
Path 0 Worker 1 Processor Flag3	Path Worker Running flag
Path 0 Status 0	NOT USED
Path 0 Status1	NOT USED
Path 0 Status2	NOT USED
Path 1 Coefficient Processor Flag3	Path Coeff Running flag
Path 1 Worker 0 Processor Flag3	Path Worker Running flag
Path 1 Worker 1 Processor Flag3	Path Worker Running flag
Path 1 Status 0	NOT USED
Path 1 Status1	NOT USED
Path 1 Status2	NOT USED
Path 2 Coefficient Processor Flag3	Path Coeff Running flag
Path 2 Worker 0 Processor Flag3	Path Worker Running flag
Path 2 Worker 1 Processor Flag3	Path Worker Running flag
Path 2 Status 0	NOT USED
Path 2 Status1	NOT USED
Path 2 Status2	NOT USED

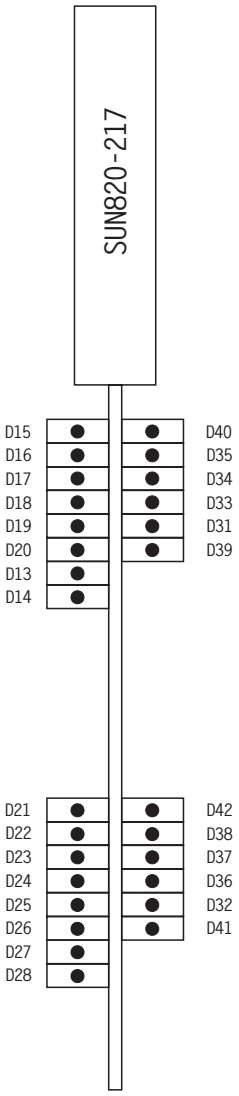
✍ *Running Flag indicates that the Sharc DSP is signal processing.*

Trancon (SUN820-217)

CARD DESCRIPTION

The Trancon board is a general-purpose processing card with two identical transputer processor sections. One transputer has a directly-addressable RAM area of 64 Mbytes and the other has 8 Mbytes in a programmable gate array, and external logic for deriving "Up" and "Down" Services connections. These, together with the four transputer links, allow the transputer to be placed in a network of interconnected transputers. The Trancon board runs programs associated with the control of the console surface and automation processes.

LED INTERPRETATION



Processor 1

15, 16, 17, 18, 19 and 20	*(yellow)* software controlled
13	*(yellow)* word count heartbeat
14	*(yellow)* word count error
40	*(red)* ON indicates Reset and/or analyze active
35	*(green)* ON indicates Link 0 active
34	*(green)* ON indicates Link 1 active
33	*(green)* ON indicates Link 2 active
31	*(green)* ON indicates Link 3 active
39	*(red)* ON indicates Transputer error

Processor 2

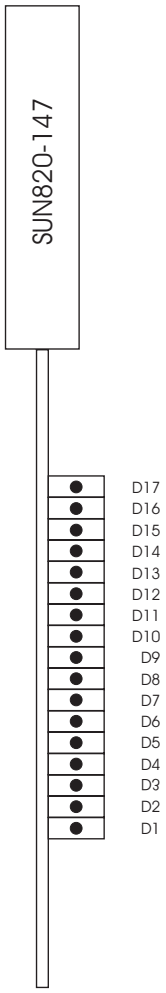
21, 22, 23, 24, 25 and 26	*(yellow)* software controlled
27	*(yellow)* word count heartbeat
28	*(yellow)* word count error
42	*(red)* ON indicates Reset and/or analyze active
38	*(green)* ON indicates Link 0 active
37	*(green)* ON indicates Link 1 active
36	*(green)* ON indicates Link 2 active
32	*(green)* ON indicates Link 3 active
41	*(red)* ON indicates Transputer error

Machine Control Card (SUN820B147)

CARD DESCRIPTION

The MCS card is a transputer based machine controller and synchroniser. The MCS card accepts a variety of reference sources from which frame and field rate clocks are derived under control of a T4 transputer. The references may be filtered by an ADSP 2105 processor or passed directly to a T2 transputer which handles the low level serial communications with the tape machines. 6 serial ports are available for machine control which can support a number of protocols and machines in user defined master and slave groups. The card can also generate references and drive TimeLine 1 or 2 at a rate independent of the current reference source.

LED INTERPRETATION



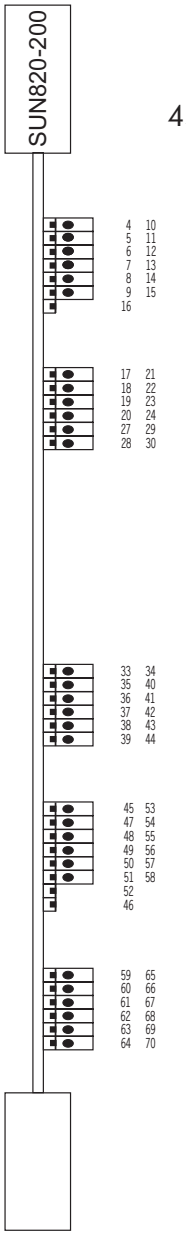
D17, D16, D15, D14, D13 & D12	(yellow) ON indicates T4 under software control.
D11, D10, D9, D8, D7 & D6	(*yellow*) ON indicates T2 under software control.
D5	(*red*) ON indicates T2 error.
D4	(*red*) ON indicates T4 error.
D3	(*green*) ON indicates T2 Link 0 activity.
D2	(*green*) ON indicates T4 Link 0 activity.
D1	(*red*) ON indicates T4 reset.

SPS Control Card (SUN820-200)

CARD DESCRIPTION

The SPS control card replaces two Trancon cards and the TranSCSI card. It consists of a possible five transputers namely, TranSCSI, File Server, Assignments, Automation and Allocation. The links between them and how they are intended to fit into the system are shown in the diagram below. The Assignments processor may not be fitted and can be jumpered out of the Link and ISP chains by fitting J12 (Note U65 and U66 must be removed in this case). All links shown on the right of the diagram with the exception of the Debug link are available on the backplane.

LED INTERPRETATION



4,5,6,7,8,9,16, 17,18,19,20,27,28, 33,35,36,37,38,39, 45,47,48,49,50,51,52,46, 59,60,61,62,63,64 *(Green)* Under software control

SCSI Processor

10 *(red)* ON indicates reset

11 *(green)* ON indicates Link 0 active

12 (*green*) ON indicates Link 1 active

13 (*green*) ON indicates Link 2 active

14 (*green*) ON indicates Link 3 active

15 (*red*) ON indicates Transputer error

File Server Processor

21 *(red)* ON indicates reset

22 *(green)* ON indicates Link 0 active

23 (*green*) ON indicates Link 1 active

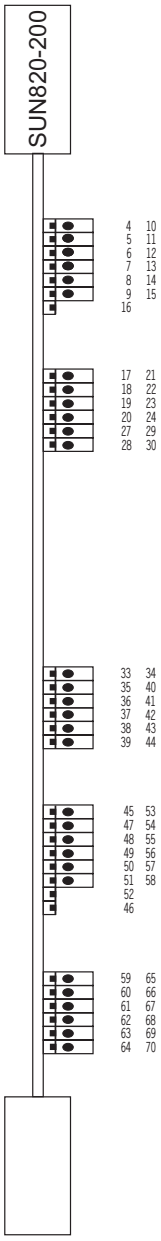
24 (*green*) ON indicates Link 2 active

29 (*green*) ON indicates Link 3 active

30 (*red*) ON indicates Transputer error

SPS Control Card (SUN820-200) continued

LED INTERPRETATION



Assignment Processor

34 *(red)* ON indicates reset

40 *(green)* ON indicates Link 0 active

41 (*green*) ON indicates Link 1 active

42 (*green*) ON indicates Link 2 active

43 (*green*) ON indicates Link 3 active

44 (*red*) ON indicates Transputer error

Automation Processor

53 *(red)* ON indicates reset

54 *(green)* ON indicates Link 0 active

55 (*green*) ON indicates Link 1 active

56 (*green*) ON indicates Link 2 active

57 (*green*) ON indicates Link 3 active

58 (*red*) ON indicates Transputer error

Allocation Processor

65 *(red)* ON indicates reset

66 *(green)* ON indicates Link 0 active

67 (*green*) ON indicates Link 1 active

68 (*green*) ON indicates Link 2 active

69 (*green*) ON indicates Link 3 active

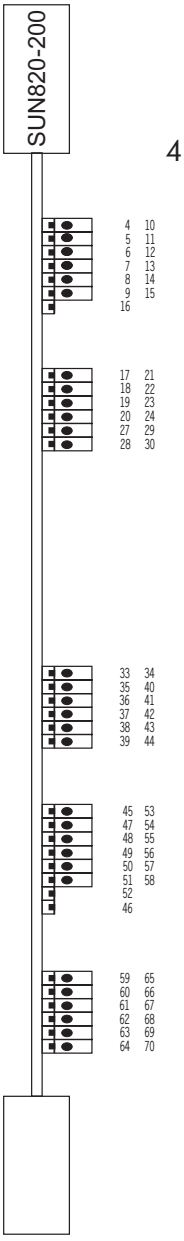
70 (*red*) ON indicates Transputer error

SPS Control Card (Fast Boot) (SUN820A200)

CARD DESCRIPTION

This fast boot version of the SPS control card replaces two TRANCON cards and the TranSCSI card. The TranSCSI, File Server, Assignments, Automation and Allocation processors are fitted with 2MB of Flash RAM. The File Server, Assignments, Automation and Allocation processors are fitted with 4MB of battery backed SRAM.

LED INTERPRETATION



4,5,6,7,8,9,16,
17,18,19,20,27,28,
33,35,36,37,38,39,
45,47,48,49,50,51,52,46,
59,60,61,62,63,64 *(Green)* Under software control

SCSI Processor

10 *(red)* ON indicates reset

11 *(green)* ON indicates Link 0 active

12 (*green*) ON indicates Link 1 active

13 (*green*) ON indicates Link 2 active

14 (*green*) ON indicates Link 3 active

15 (*red*) ON indicates Transputer error

File Server Processor

21 *(red)* ON indicates reset

22 *(green)* ON indicates Link 0 active

23 (*green*) ON indicates Link 1 active

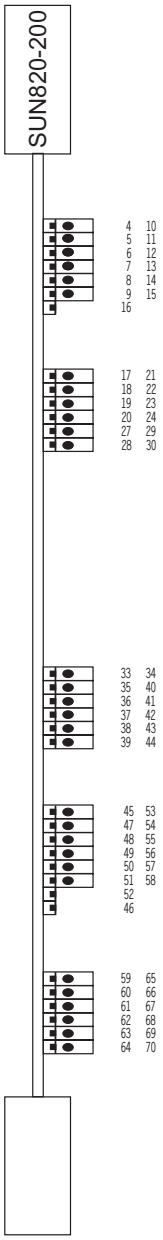
24 (*green*) ON indicates Link 2 active

29 (*green*) ON indicates Link 3 active

30 (*red*) ON indicates Transputer error

SPS Control Card (Fast Boot) (SUN820A200) continued

LED INTERPRETATION



Assignment Processor

34 *(red)* ON indicates reset

40 *(green)* ON indicates Link 0 active

41 (*green*) ON indicates Link 1 active

42 (*green*) ON indicates Link 2 active

43 (*green*) ON indicates Link 3 active

44 (*red*) ON indicates Transputer error

Automation Processor

53 *(red)* ON indicates reset

54 *(green)* ON indicates Link 0 active

55 (*green*) ON indicates Link 1 active

56 (*green*) ON indicates Link 2 active

57 (*green*) ON indicates Link 3 active

58 (*red*) ON indicates Transputer error

Allocation Processor

65 *(red)* ON indicates reset

66 *(green)* ON indicates Link 0 active

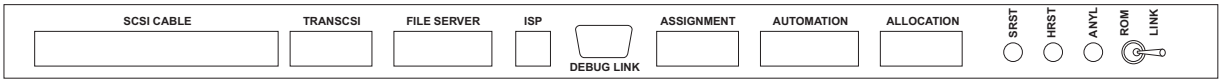
67 (*green*) ON indicates Link 1 active

68 (*green*) ON indicates Link 2 active

69 (*green*) ON indicates Link 3 active

70 (*red*) ON indicates Transputer error

SPS Control Card (Fast Boot) (SUN820A200) continued

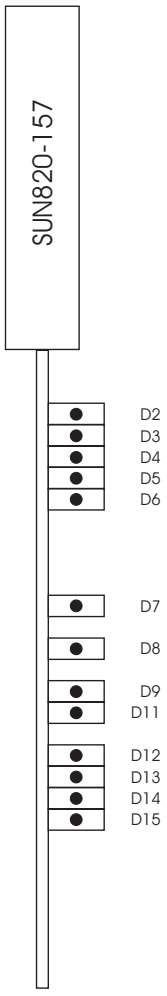


TranSync PLUS (SUN820B157)

CARD DESCRIPTION

TranSync Plus is a transputer-based master timing controller card which generates sampling clocks and timing signals for controlling a 128-slot time-division multiplexed (TDM) 32-bit Audio Bus. Complex PLL hardware allows the card to lock the system to a wide range of audio and video reference signals. In addition, TranSync Plus can control any co-resident audio interface cards and, via its transputer links, any other transputer-based processing cards.

LED INTERPRETATION



D2 (*red*) ON indicates Transputer error.

D3 (*green*) ON indicates Transputer Link 0 activity.

D4 (*green*) ON indicates Transputer Link 1 activity.

D5 (*green*) ON indicates Transputer Link 2 activity.

D6 (*green*) ON indicates Transputer Link 3 activity.

D7 (*red*) ON indicates Transputer reset.

D8 (*yellow*) ON indicates AES/EBU reference input clock.

D9 (*green*) ON indicates Rough lock acquired.

D11 (*green*) ON indicates Fine lock acquired.

D12 (*yellow*) ON indicates Video Lock (with D14 or D15) or Varispeed Mode.

D13 (*yellow*) ON indicates Word Lock.

D14 (*yellow*) ON indicates Wide (+/-12.5%) PLL selected.

D15 (*yellow*) ON indicates VCXO (narrow) PLL selected.

MIOS Rack Cards

SAI800-036	**8 Channel Line Output Board**
SPN815-120	**8 Channel Line Input Board**
SPN815-121	**2 Channel Mic Line Input Board**
SBL801-040	**XLR Connector Board**
SHN857-115	**Backplane**

8 Channel Line Output Board (SAI800-036)

CARD DESCRIPTION

Only one board in a module pair controls and reads the front panel board via a ten way IDC cable connected to J3. This cable carries switch voltage information and serial data used to load the LEDs on the front panel board.

Issue 1 and 2 Line Output boards had digitally controlled attenuators to set headroom gain which were controlled by serial data and clock from the processor.

Issue 3 boards and above have push on links to set the headroom gain. The headroom link positions are marked on the circuit board. There is however an error on Issue 3 boards. The 26dB headroom position does not work without the fitting of 8 off 15k resistors in positions R355 to R362. With these resistors in place the other headroom settings are wrong so they should only be fitted for 26dB headroom working. This error is corrected on Issue 4 boards.

Issue 4 boards have an adjustment for the reference supply to the DACs. This will help to allow for output level change with power supply voltage. VR1 should be set to give 4.75V +/-0.05Von the positive end of C289. This adjustment can be adjusted finely to control the average output level of the 8 channels on the board.

An option is available to replace the 24dB setting with a 22dB headroom setting. This board is part number **SAI800A036** and is shipped in module AM4663/22DB. The modification involves replacing R347 to R354 inclusive with 7k5.

8 Channel Line Input Board (SPN815-120)

CARD DESCRIPTION

Only one board in a module pair controls and reads the front panel board via a ten way IDC cable connected to J2. This cable carries switch voltage information and serial data used to load the LED's on the front panel board.

Issue 1 and 2 boards had digitally controlled attenuators to set headroom gain which were controlled by serial data and clock from pins 11 through to 16 of U8. Issue 3 boards onward have push on links to set the headroom gain.

Early modules had a gain control IC (U28) on each input controlled by serial data and clock from the processor. Issue 3 onwards has a headroom set by a push on link on each channel. Link Headroom settings are detailed on the board and can be selected from 26dB (0dB gain), 24dB (2dB gain), 20dB (6dB gain), 18dB (8dB gain) and 15dB (11dB gain).

A trim of approximately +/-0.5dB on each channel is available to match an external peak signal of +26dBu to 0dBFS in the ADC.

0dBFS Adjustments are as follows. The channel number for the left hand board is first.

Left board	Right Board	Preset
1	2	VR8
4	3	VR7
5	6	VR6
7	8	VR5
9	10	VR4
11	12	VR3
14	13	VR2
15	16	VR1

An option is available to replace the 24dB setting with a 22dB headroom setting. This board is part number SPN815A120 and is shipped in module AM4662/22DB. The modification involves replacing R184 to R191 inclusive with 12k7.

2 Channel Mic Line Input Board (SPN815-121)

CARD DESCRIPTION

Only one board in a module pair controls and reads the front panel board via a ten way IDC cable connected to J3. This cable carries switch voltage information and serial data used to load the LED's on the front panel board.

CMRR for the two channels is trimmed by adjustment of VR3 and VR4. Apply the same signal to both positive and negative balanced inputs of mic input A on each channel in turn and adjust the preset for minimum output level to the console on that channel. Alternatively on Issue 4 boards there are test points CH1P and CH1N (CH2P and CH2N) which are balanced outputs which can be monitored.

Early modules had the headroom set in the gain control IC (U45) controlled by serial data and clock from the processor. This gain block was driven by the headroom setting on Encore. A headroom setting of 26dB required a gain of 0dB, a headroom setting of 20dB required a gain of 6dB and so on. These ensured that a reduced external maximum headroom would be amplified up to fill the available internal headroom on the ADC.

Issue 3 onwards has headroom set by a push on link on each channel. Link Headroom settings are detailed on the board and can be selected from 26dB (0dB gain), 24dB (2dB gain), 20dB (6dB gain), 18dB (8dB gain) and 15dB (11dB gain). The digitally controlled gain block U45 is still in place and is used for fine gain setting on the mic input and line trim for the line input.

After the gain block the headroom corrected signal is fed through a high pass filter. The frequency of the filter is nominally set to 90Hz. If a different low frequency roll off is required it is possible to remove R94, R96 and R93 to get a frequency of approximately 60Hz.

A trim of approximately +/-0.5dB is available to match an external peak signal of +26dBu to 0dBFS in the ADC (26dB headroom setting). With line in selected apply a signal at 0dBu and adjust VR2 (VR1 on the second channel) to adjust the level fed to the console. For +24dB headroom for example a 0dBu signal should give -24dBFS.

The output from the filter is fed to a peak limiter comprised of VCA U19 and side chain IC U21. VR8 (VR7) sets the threshold of the limiter. VR12 (VR11) sums a preset voltage into the VCA control voltage to give a constant 9dB gain. This is counteracted by the console reducing the gain into the limiter at the gain block U45. The threshold setting is then set to limit the signal to the ADCs at approximately -1dBFS. VR6 (VR5) sets the distortion and control feedthrough on the VCA to a minimum.

With 0dB input line signal applied and the limiter switched on, adjust VR12 (VR11) to give -1dB of gain at the console. For +24dB headroom for example that would correspond to -25dBFS. Now measure distortion either using a line out channel or using the balanced test points CH1N and CH1P (CH2N and CH2P) and adjust VR6 (VR5) for minimum distortion . Apply a signal to the inputs which is above the maximum headroom level e.g. +26dBu and adjust VR8 (VR7) to give -1dBFS.

Overall this gives up to around 10dB of limiting on a signal that would have otherwise passed into clip. This is true as long as the input signal (whether mic or line) is kept at least 10dB below the input clip level (+26dBu for line and +19dBu for mic). When working with

reduced headroom levels this will generally be true, for example with headroom set to 18dB the limiter will begin to work at +17dBu line input. It will then be possible to put up to the maximum +26dBu signal into the input while the limiter keeps the signal to around -1dBFS. Alternatively in the same situation the user could set the line input gain trim to +10dB and all input signals from +8dBu up to +18dBu will be limited to -1dBFS.

An option is available to replace the 24dB setting with a 22dB headroom setting. This board is part number **SPN815A121** and is shipped in module AM4624/22DB. The modification involves replacing R349 and R350 with 12k7.

XLR Connector Board (SBL801-040)

CARD DESCRIPTION

The XLR connector PCB carries the wordclk buffer and reshaping circuitry. U2 is a balanced line receiver with a 5V TTL output. The TTL output goes to the backplane and then to the digital control module.

The TTL output is buffered by U1 and is output on a second BNC.

Backplane (SHN857-115)

CARD DESCRIPTION

Audio connectors

Audio modules plug into 96 way DIN connectors J1 to J12. The top half of the connectors handles analogue audio signals or AES audio signals, the bottom half of the connector handles the digital audio and clocks to the digital control module.

A pair of boards makes up one audio module and the 16 signals to the two boards are split between them as follows. Looking from the front the left hand board of a pair handles channels 1, 4, 5, 7, 9, 11, 14 and 15. The right hand board handles 2, 3, 6, 8, 10, 12, 13 and 16. If a fault is discovered in a module the channel number will therefore determine which of the two boards the fault is on.

The audio signals comprise of three connections: H, C and G for ground. These signals are grouped on a single row A, B and C of the 96 way connector. The 8 triples are interspersed with the analogue power rails at the top of the connector.

Below on A20, B20, C20 and A21 are the four ID lines which tell the board its address or position in the rack. On J1 they are all low and this is read as 0 which is then translated as board 1 by adding 1. On J2 ID0 is connected to +5V which is translated as board 2. This is used to map modules to MADI channels and to allow the desk and digital control module to be able to address the boards individually with control messages.

Rows 23 to 26 of the 96 way DIN connectors are the digital audio signals to and from the digital control module. There are four signals IN to the rack and four signals OUT to the audio board. Each signal carries a pair of digital audio channels so forming 8 digital out and 8 digital input lines for each board and therefore 16 in and out for each module. All are standard TTL levels.

Row 29 carries the balanced RS485 control lines to all the audio modules. Each of the twelve boards will respond to messages from the master module over this link. The digital control module continuously polls the modules to check if any have been removed or replaced. It also checks for switch press messages from the module front panels and transmits control messages to the audio circuitry on the audio modules. The link is an asynchronous pair of 5V logic signals at 19.2kbaud which are in antiphase to each other.

A30, A31 and C30 carry the three clocks used by the audio modules for synchronization to the rack. A30 carries wordclock of (48kHz at a 48kHz system rate), C30 carries a bit clock (BCLK or SCLK) of 64 times word clock (3.072MHz at 48kHz sample rate) and A31 carries a master clock (MCLK) of 256 times word clock (12.288MHz at 48kHz sample rate). All are standard TTL levels.

Digital Control Module connectors

The digital audio and clock signals for the first 6 boards drop down to J15, the signals for the last 6 boards are passed to the digital control module by J16.

J16 also carries the following signals from the digital control module to J68 which is the connector for the digital I/O card.

1. 8 channels of GP output lines each consisting of relay connections NC, NO and W corresponding to 'normally closed', 'normally open' and 'wiper'.

2. 8 channels of GP input each of which is connected to the anode of an opto isolator input. There is also an isolated return from the common cathodes and ground and 5V lines which can be used to drive the opto isolators via external switches.

3. The external RS485 connection which can be used to control the rack.

J16 carries the following signals which go to the XLR connector PCB via J69:

1. Four balanced output signals. These are intended to be used for local monitoring and are at a slightly lower level than the standard line outputs to reduce the amount of headroom wasted when feeding amplifiers. 0dbFS from the console is output at +20dBu balanced. There is no headroom control from the console relating to these outputs.

2. The AES sync input from an external sync source. This is a balanced AES audio line.

3. The AES sync output from the digital control module's sync circuitry.

4. A TTL word clock signal from the external Wordclk input.

5. Power to drive the Wordclk receiver and output buffer.

Power Supply

Mains is present on the backplane in this area. The two power supplies have independent mains connectors each of which feed the power modules via J33, J34 and the two 15 way power DIN connectors J13 and J14.

48 Volts from the two supplies is dioded together by D4 and D5 and filtered by L3 and C30. The two 48V lines are sensed by the two comparators U2 and logically or'ed to give a single n48VP_OK line for the digital control module.

The two 5VA lines are dioded together by D1 and D2 and filtered by C34. The two 5V digital or VCC lines are dioded together by D6 and D7 and filtered by C33. The four 5V lines are monitored by the comparators in U1 and diode or'ed to give a composite n5VP_OK line.

The 48V ok and 5V okay lines are also diode or'ed to give PSU1 and PSU2 okay lines for the digital control module.

The +16V and -16V line have already been sensed in the power modules and the composite 16V okay lines from the power modules go to the digital control module. Because the +/-16V lines have diodes in line within the power modules the outputs of the +16 supplies and -16V supplies are simply joined together on the backplane before filtering by L1 and C31 and C32.

The returns of the various supplies are kept separate but are joined at the central earth point which is in the middle of the two power module connectors on the backplane. A wire from there goes to the rear panel earth lift switch where it can be connected to chassis or not as required. For safety the chassis would normally be left securely connected to chassis at the earth lift unless it can be guaranteed that the audio circuitry 0V has a secure path to earth via another route.

AES960 I/O Unit Cards

SMN812-312	**16 Channel Digital I/O Interface Card**
SMN812-313	**Backplane Interface Card**

16 Channel Digital I/O Interface Card (SMN812-312)

CARD DESCRIPTION

Up to 4 cards can be fitted on to the AES960 motherboard, this gives a maximum of 56 Input / 56 Output, AES mono channels.

The I/O card provides 8 stereo channels of AES3 digital inputs with sample rate converters and 8 stereo channels of AES3 digital outputs with sample rate converters. The digital signals should be at a sample rate of 44.1khz to 96khz at an impedance of 110 W ± 20%.

Each stereo digital input can be fed directly to the MADI output stream or through a sample rate converter with a 3:1 sample rate ratio.

Each stereo digital output can be fed directly from the MADI input stream or through a sample rate converter with a 3:1 sample rate ratio.

Each stereo digital output can be synchronized to the AES input clock source in blocks of 4 stereo channels, to the AES960 sync source clock or to any of the 4 internal clocks.

All of these options can be set using the AES960 front panel button display or via a suitable Ch55 MADI stream from an AMS console.

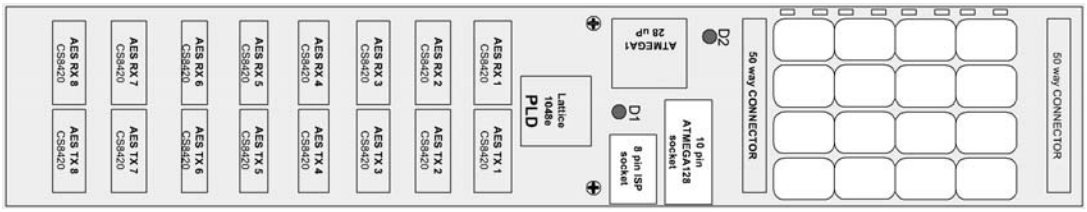
Internally the card is controlled by RS485 from the Host micro controller on the motherboard, this is separate to the RS485 signal on the AES960 rear panel.

Jumper LK1 to LK8 introduce digital input signal equalization when removed, these should be fitted for normal operation with AES cables up to 100 meters.

The board has 2 LEDs which will flash in normal operation, these are driven by a ATmega128 micro controller (uP).

A 10 way Dubox connector is fitted for in-system programming of micro controller only. An 8 way Dubox connector is fitted for in-system programming of PLDs only.

LED INTERPRETATION



D2 *(green)* ON indicates the card is working

D1 *(green)* ON indicates communication with the Host micro controller

SW1 This is for development only, it resets the micro controller

Backplane Interface Card (SMN812-313)

CARD DESCRIPTION

This card interfaces between the 2 x 37 way and 2 x 50 way 'D' sockets on the rear of the AES960 unit, the Digital card and the 4 Daughter boards.

This card supports up to 4 daughter cards giving a maximum of 56 Input / 56 Output, AES mono channels.

The transformers on this board support AES3 digital signals at a sample rate of 44.1khz to 96khz with at an impedance of 110 W ± 20%.

Internally the card is controlled by RS485 from the Host micro controller on the mother PCB, this is separate to the RS485 signal on the AES960 rear panel.

Jumper LK1 to LK8 introduce digital input signal equalization when removed, these should be fitted for normal operation with AES cables up to 100 meters.

Power for the optional MADI Optical interface is provided by 'J88'.

The external BNC word clock signal is connected to 'J91'.

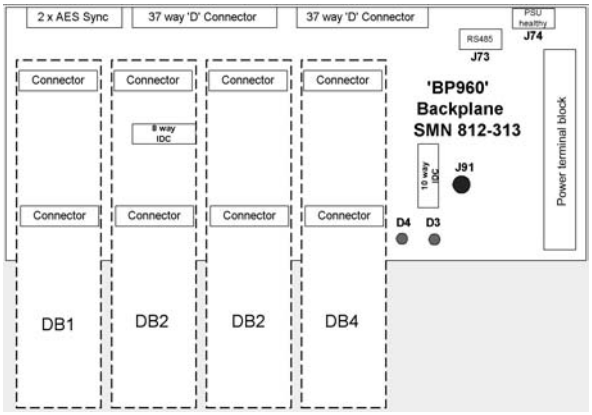
The dual power supplies connect to a 'push to release' terminal block.

The external RS485 signal and the 9 pin 'D' 'PSU HEALTHY' ribbon connect to lockable 10 way IDC receptacles.

A 10 way IDC Dubox connector is fitted for in-system programming of micro controller. An 8 way IDC Dubox connector is fitted for in-system programming of PLDs only.

The board has 2 LEDs which will flash in normal operation, these are driven by a ATmega128 micro processor (uP).

LED INTERPRETATION



D4 *(green)* ON indicates the card is working.

D3 *(green)* ON indicates communication with the Host controller.

SW1 This is for development only, it resets the micro controller.

Relay Control Unit Cards

Processor (SCS802–079)

CARD DESCRIPTION

The Relay Control Unit Processor is a T2 transputer based card controlling the five lower 37 way D-types, with 64 relay loops and sixteen opto-isolator loops as detailed below.

The relay loops are specified as follows :-

Max voltage across relay - 100V dc

Max current through relay - 0.5A dc

Max power switched by relay - 10W

Contact resistance - 150 mom

Life at full load - 5 million operations

Typical operation time - 0.4 msec

There are also sixteen opto-isolators taken out as current loops to a separate 37 way D-type.

The current loop is specified as follows :-

Absolute maximum current through loop - 60mA

Max reverse voltage across loop - 6V

Surge current - 1.5A

Minimum current to operate loop - 2mA

The four upper 37 way D-types on the back panel are for expansion and customization of the box and will be covered on separate options sheets.

LED INTERPRETATION

1 (*red*) On indicates transputer error

2 (*green*) On indicates link 0 active

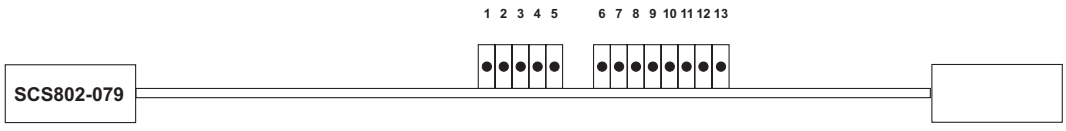
3 (*green*) On indicates link 1 active

4 (*green*) On indicates link 2 active

5 (*green*) On indicates link 3 active

6 (*red*) On indicates Reset active

7, 8, 9, 10, 11, 12 and 13 (*yellow*) Software controlled. Off indicates normal operation



SPS – Connector Pin Allocations

Bottom XSP Backplane Connector (viewed from front)

PIN	A	B	C
1	GOD	GOD	GOD
2	VCC	VCC	VCC
3	LkIn0+	GOD	Bus D0
4	LkIn0–	GOD	Bus D1
5	LkOut0–	GOD	Bus D2
6	LkOut0+	GOD	Bus D3
7	LkIn1+	GOD	Bus D4
8	LkIn1–	GOD	Bus D5
9	LkOut1–	GOD	Bus D6
10	LkOut1+	GOD	Bus D7
11	LkIn2+	Bus D12	Bus D8
12	LkIn2–	Bus D13	Bus D9
13	LkOut2–	Bus D14	Bus D10
14	LkOut2+	Bus D15	Bus D11
15	LkIn3+	Bus D16	GOD
16	LkIn3–	Bus D17	GOD
17	LkOut3–	Bus D18	GOD
18	LkOut3+	Bus D19	GOD
19	UpRst	Bus D20	GOD
20	UpAna	Bus D21	GOD
21	UpErr	Bus D22	GOD
22	Rst1	Bus D23	GOD
23	Ana1	Bus D24	GOD
24	Err1	Bus D25	GOD
25	Rst2	Bus D26	GOD
26	Ana2	Bus D27	GOD
27	Err2	Bus D28	GOD
28	Rst3	Bus D29	GOD
29	Ana3	Bus D30	GOD
30	Err3	Bus D31	GOD
31	VCC	VCC	VCC
32	GOD	GOD	GOD

SPS – Connector Pin Allocations continued

Middle XSP Backplane Connector (viewed from front)

PIN	A	B	C
1	GOD	GOD	GOD
2	VCC	VCC	VCC
3	GOD	BitClk+	Bus C0
4	GOD	BitClk–	Bus C1
5	GOD	WdData+	Bus C2
6	GOD	WdData–	Bus C3
7	GOD	WdClk+	Bus C4
8	GOD	WdClk–	Bus C5
9	GOD	GOD	Bus C6
10	GOD	GOD	Bus C7
11	GOD	NC	Bus C8
12	GOD	NC	Bus C9
13	GOD	GOD	Bus C10
14	GOD	GOD	Bus C11
15	GOD	BusClk+	Bus C12
16	GOD	BusClk–	Bus C13
17	GOD	GOD	Bus C14
18	GOD	GOD	Bus C15
19	GOD	BusClr+	Bus C16
20	GOD	BusClr–	Bus C17
21	GOD	GOD	Bus C18
22	GOD	GFlipEn	Bus C19
23	GOD	GFlipEn	Bus C20
24	GOD	GOD	Bus C21
25	GOD	GOD	Bus C22
26	GOD	GOD	Bus C23
27	Bus C28	GOD	Bus C24
28	Bus C29	GOD	Bus C25
29	Bus C30	GOD	Bus C26
30	Bus C31	GOD	Bus C27
31	VCC	VCC	VCC
32	GOD	GOD	GOD

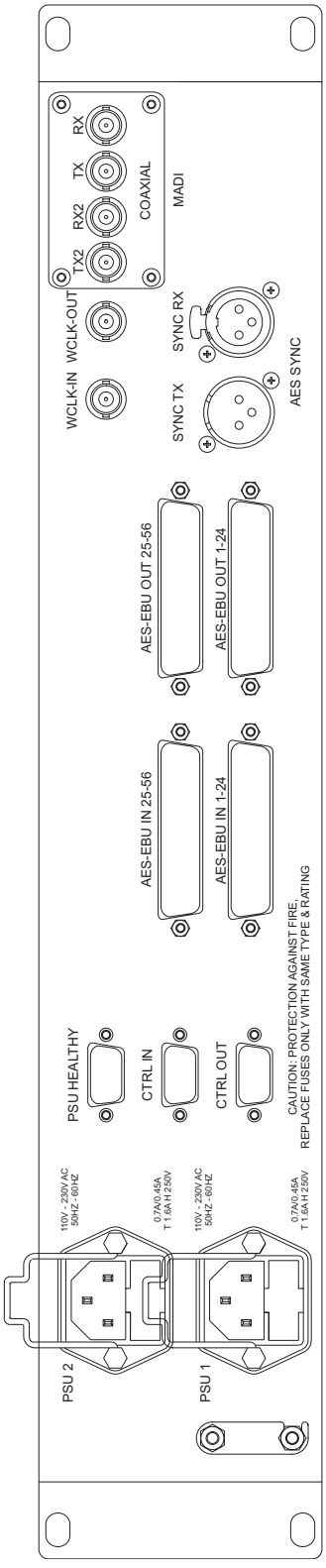
SPS – Connector Pin Allocations continued

Top XSP Backplane Connector (viewed from front)

PIN	A	B	C
1	GOD	GOD	GOD
2	VCC	VCC	VCC
3	Bus A0	Bus A28	Bus B0
4	Bus A0	Bus A29	Bus B1
5	Bus A1	Bus A30	Bus B2
6	Bus A2	Bus A31	Bus B3
7	Bus A3	GOD	Bus B4
8	Bus A4	GOD	Bus B5
9	Bus A5	GOD	Bus B6
10	Bus A6	GOD	Bus B7
11	Bus A7	GOD	Bus B8
12	Bus A8	GOD	Bus B9
13	Bus A9	GOD	Bus B10
14	Bus A10	GOD	Bus B11
15	Bus A11	GOD	Bus B12
16	Bus A12	GOD	Bus B13
17	Bus A13	GOD	Bus B14
18	Bus A14	GOD	Bus B15
19	Bus A15	GOD	Bus B16
20	Bus A16	GOD	Bus B17
21	Bus A17	GOD	Bus B18
22	Bus A18	GOD	Bus B19
23	Bus A19	GOD	Bus B20
24	Bus A20	GOD	Bus B21
25	Bus A21	GOD	Bus B22
26	Bus A23	GOD	Bus B23
27	Bus A24	Bus B28	Bus B24
28	Bus A25	Bus B29	Bus B25
29	Bus A26	Bus B30	Bus B26
30	Bus A27	Bus B31	Bus B27
31	VCC	VCC	VCC
32	GOD	GOD	GOD

External Connections and Interfacing

Multichannel AES I/O Unit



AES-EBU IN - Standard I/O

Location: Rear of Multichannel AES I/O Unit

Mating connector required: 37-way D type male

Pin No.	Signal type	Channel
37	Hot	AES 1AB In
36	Cold	
18	Screen	
17	Hot	AES 2AB In
16	Cold	
35	Screen	
34	Hot	AES 3AB In
33	Cold	
15	Screen	
14	Hot	AES 4AB In
13	Cold	
32	Screen	
31	Hot	AES 5AB In
30	Cold	
12	Screen	
11	Hot	AES 6AB In
10	Cold	
29	Screen	
28	Hot	AES 7AB In
27	Cold	
9	Screen	
8	Hot	AES 8AB In
7	Cold	
26	Screen	
25	Hot	AES 9AB In
24	Cold	
6	Screen	
5	Hot	AES 10AB In
4	Cold	
23	Screen	
22	Hot	AES 11AB In
21	Cold	
3	Screen	
2	Hot	AES 12AB In
1	Cold	
20	Screen	

AES-EBU OUT - Standard I/O

Location: Rear of Multichannel AES I/O Unit

Mating connector required: 37-way D type male

Pin No.	Signal type	Channel
37	Hot	AES 1AB Out
36	Cold	
18	Screen	
17	Hot	AES 2AB Out
16	Cold	
35	Screen	
34	Hot	AES 3AB Out
33	Cold	
15	Screen	
14	Hot	AES 4AB Out
13	Cold	
32	Screen	
31	Hot	AES 5AB Out
30	Cold	
12	Screen	
11	Hot	AES 6AB Out
10	Cold	
29	Screen	
28	Hot	AES 7AB Out
27	Cold	
9	Screen	
8	Hot	AES 8AB Out
7	Cold	
26	Screen	
25	Hot	AES 9AB Out
24	Cold	
6	Screen	
5	Hot	AES 10AB Out
4	Cold	
23	Screen	
22	Hot	AES 11AB Out
21	Cold	
3	Screen	
2	Hot	AES 12AB Out
1	Cold	
20	Screen	

AUX AES-EBU IN - Optional Expansion 1 or 2 Cards

Location: **Rear of Multichannel AES I/O Unit**

Mating connector required: 50-way D type male

Pin No.	Signal type	Channel	
		1 Exp. Card	2 Exp. Card
33	Hot	AES 13AB In	AES 13AB In
49	Cold		
16	Screen		
15	Hot	AES 14AB In	AES 14AB In
32	Cold		
48	Screen		
31	Hot	AES 15AB In	AES 15AB In
47	Cold		
14	Screen		
13	Hot	AES 16AB In	AES 16AB In
30	Cold		
46	Screen		
29	Hot	AES 17AB In	AES 17AB In
45	Cold		
12	Screen		
11	Hot	AES 18AB In	AES 18AB In
28	Cold		
44	Screen		
27	Hot	AES 19AB In	AES 19AB In
43	Cold		
10	Screen		
9	Hot	AES 20AB In	AES 20AB In
26	Cold		
42	Screen		
25	Hot		AES 21AB In
41	Cold		
8	Screen		
7	Hot		AES 22AB In
24	Cold		
40	Screen		
23	Hot		AES 23AB In
39	Cold		
6	Screen		
5	Hot		AES 24AB In
22	Cold		
38	Screen		
21	Hot		AES 25AB In
37	Cold		
4	Screen		
3	Hot		AES 26AB In
20	Cold		
36	Screen		
19	Hot		AES 27AB In
35	Cold		
2	Screen		
1	Hot		AES 28AB In
18	Cold		
34	Screen		

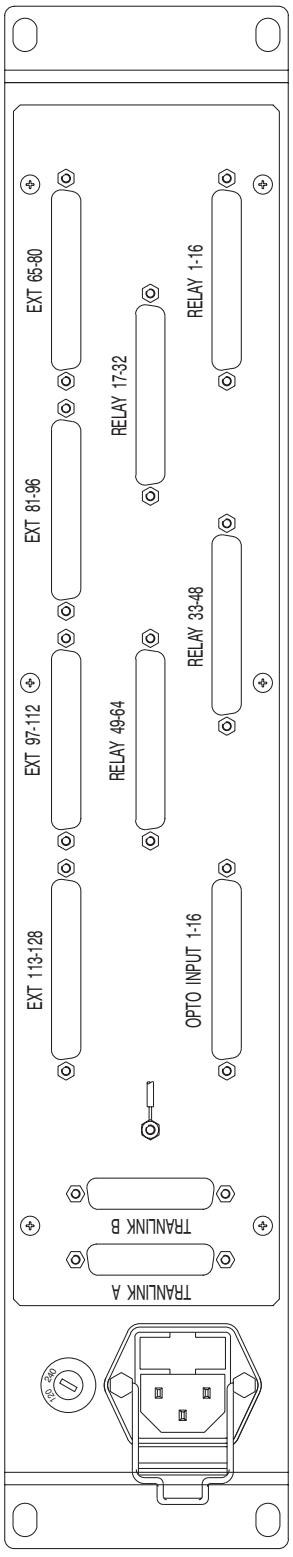
AUX AES-EBU OUT - Optional Expansion 3 or 4 Cards

Location: **Rear of Multichannel AES I/O Unit**

Mating connector required: 50-way D type male

Pin No.	Signal type	Channel	
		3 Exp.Card	4 Exp.Card
33	Hot	AES 13AB Out	AES 13AB Out
49	Cold		
16	Screen		
15	Hot	AES 14AB Out	AES 14AB Out
32	Cold		
48	Screen		
31	Hot	AES 15AB Out	AES 15AB Out
47	Cold		
14	Screen		
13	Hot	AES 16AB Out	AES 16AB Out
30	Cold		
46	Screen		
29	Hot	AES 17AB Out	AES 17AB Out
45	Cold		
12	Screen		
11	Hot	AES 18AB Out	AES 18AB Out
28	Cold		
44	Screen		
27	Hot	AES 19AB Out	AES 19AB Out
43	Cold		
10	Screen		
9	Hot	AES 20AB Out	AES 20AB Out
26	Cold		
42	Screen		
25	Hot		AES 21AB Out
41	Cold		
8	Screen		
7	Hot		AES 22AB Out
24	Cold		
40	Screen		
23	Hot		AES 23AB Out
39	Cold		
6	Screen		
5	Hot		AES 24AB Out
22	Cold		
38	Screen		
21	Hot		AES 25AB Out
37	Cold		
4	Screen		
3	Hot		AES 26AB Out
20	Cold		
36	Screen		
19	Hot		AES 27AB Out
35	Cold		
2	Screen		
1	Hot		AES 28AB Out
18	Cold		
34	Screen		

Relay Control Unit (Fader Start)



RELAY CONNECTORS

Location: Rear of Relay Control Unit

Mating connector required: 37–way D type male

PINOUT : 37 WAY RELAY LOOP D'S

MAX CURRENT THROUGH EACH PAIR : 0.5A

MAX VOLTAGE ON RELAY CONTACTS : 100V

'RELAY 1–16'		
	PIN	PIN
RELAY 1	1	20
RELAY 2	2	21
RELAY 3	3	22
RELAY 4	4	23
RELAY 5	5	24
RELAY 6	6	25
RELAY 7	7	26
RELAY 8	8	27
RELAY 9	9	28
RELAY 10	10	29
RELAY 11	11	30
RELAY 12	12	31
RELAY 13	13	32
RELAY 14	14	33
RELAY 15	15	34
RELAY 16	16	35

'RELAY 17–32'		
	PIN	PIN
RELAY 17	1	20
RELAY 18	2	21
RELAY 19	3	22
RELAY 20	4	23
RELAY 21	5	24
RELAY 22	6	25
RELAY 23	7	26
RELAY 24	8	27
RELAY 25	9	28
RELAY 26	10	29
RELAY 27	11	30
RELAY 28	12	31
RELAY 29	13	32
RELAY 30	14	33
RELAY 31	15	34
RELAY 32	16	35

'RELAY 33–48'		
	PIN	PIN
RELAY 33	1	20
RELAY 34	2	21
RELAY 35	3	22
RELAY 36	4	23
RELAY 37	5	24
RELAY 38	6	25
RELAY 39	7	26
RELAY 40	8	27
RELAY 41	9	28
RELAY 42	10	29
RELAY 43	11	30
RELAY 44	12	31
RELAY 45	13	32
RELAY 46	14	33
RELAY 47	15	34
RELAY 48	16	35

'RELAY 49–64'		
	PIN	PIN
RELAY 49	1	20
RELAY 50	2	21
RELAY 51	3	22
RELAY 52	4	23
RELAY 53	5	24
RELAY 54	6	25
RELAY 55	7	26
RELAY 56	8	27
RELAY 57	9	28
RELAY 58	10	29
RELAY 59	11	30
RELAY 60	12	31
RELAY 61	13	32
RELAY 62	14	33
RELAY 63	15	34
RELAY 64	16	35

OPTO–ISOLATED READER INPUTS

Location: Rear of Relay Control Unit

Mating connector required: 37–way D type male

OPTO–ISOLATED READER INPUTS : 'OPTO INPUT 1–16'

Notes :

+5v MUST be connected via 470 ohm resistor to limit current into opto inputs to 10mA.

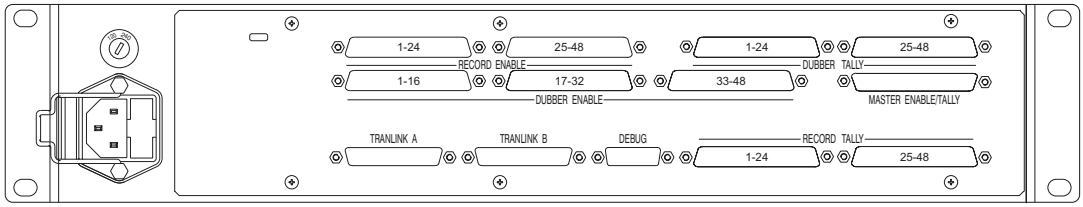
Rec Tally MUST be connected via a series 2.7k ohm resistor to limit current into opto inputs.

Record & Play Tallies for Multitrack shown below are Active Low.

To make Multitrack Rec & Play Tallies High, connect Relay Pin #1 via a 470 ohm resistor to the +5V (Record) line, and connect Relay Pin #20 to +0v without any resistor.

'OPTO–INPUT 1–16'		
	PIN	**PIN**
INPUT 1	1	20
INPUT 2	2	21
INPUT 3	3	22
INPUT 4	4	23
INPUT 5	5	24
INPUT 6	6	25
INPUT 7	7	26
INPUT 8	8	27
INPUT 9	9	28
INPUT 10	10	29
INPUT 11	11	30
INPUT 12	12	31
INPUT 13	13	32
INPUT 14	14	33
INPUT 15	15	34
INPUT 16	16	35

Recorder Interface Unit (Logic DFC only)



Opto-isolated tallies

There are 96 opto-isolated inputs for the 48 record and 48 dubber tracks plus a further 8 opto-isolated inputs for any master monitoring functions.

Record enable relays

There are 48 normally open relays for connection to MTR.

Dubber relays

There are 48 Dubber relays for connection to Dubber.

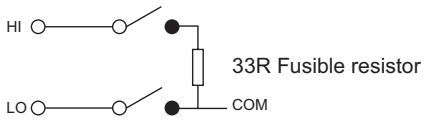
Master relays

These normally open 8 relays are intended for master control operations (Master Record/Master Play etc.).

Dubber Record Enable Relays

Location: Rear of Recorder Interface Unit - labelled 'Dubber Enable'

Mating connectors required: 50-way D type male



These relays are accessed as relays 1-48 from Encore I/O configuration. (i.e. setting relay 1 in Encore I/O configuration will address Dubber Record Enable 1).

1-16	HI	LO	COM
	PIN	PIN	PIN
Dubber Relay 1	2	34	18
Dubber Relay 2	3	35	19
Dubber Relay 3	4	36	20
Dubber Relay 4	5	37	21
Dubber Relay 5	6	38	22
Dubber Relay 6	7	39	23
Dubber Relay 7	8	40	24
Dubber Relay 8	9	41	25
Dubber Relay 9	10	42	26
Dubber Relay 10	11	43	27
Dubber Relay 11	12	44	28
Dubber Relay 12	13	45	29
Dubber Relay 13	14	46	30
Dubber Relay 14	15	47	31
Dubber Relay 15	16	48	32
Dubber Relay 16	17	49	33

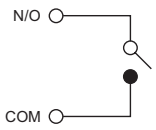
17-32	HI	LO	COM
	PIN	PIN	PIN
Dubber Relay 17	2	34	18
Dubber Relay 18	3	35	19
Dubber Relay 19	4	36	20
Dubber Relay 20	5	37	21
Dubber Relay 21	6	38	22
Dubber Relay 22	7	39	23
Dubber Relay 23	8	40	24
Dubber Relay 24	9	41	25
Dubber Relay 25	10	42	26
Dubber Relay 26	11	43	27
Dubber Relay 27	12	44	28
Dubber Relay 28	13	45	29
Dubber Relay 29	14	46	30
Dubber Relay 30	15	47	31
Dubber Relay 31	16	48	32
Dubber Relay 32	17	49	33

33-48	HI	LO	COM
	PIN	PIN	PIN
Dubber Relay 33	2	34	18
Dubber Relay 34	3	35	19
Dubber Relay 35	4	36	20
Dubber Relay 36	5	37	21
Dubber Relay 37	6	38	22
Dubber Relay 38	7	39	23
Dubber Relay 39	8	40	24
Dubber Relay 40	9	41	25
Dubber Relay 41	10	42	26
Dubber Relay 42	11	43	27
Dubber Relay 43	12	44	28
Dubber Relay 44	13	45	29
Dubber Relay 45	14	46	30
Dubber Relay 46	15	47	31
Dubber Relay 47	16	48	32
Dubber Relay 48	17	49	33

Multi-Track Record Enable Relays

Location: Rear of Recorder Interface Unit - labelled 'Record Enable'

Mating connector required: 50-way D type male



Normally open relays rated at:

0.5A switching current
10VA max switching power
100V max operating voltage
1A max closed contact rating

These relays are accessed as relays 49-96 from Encore I/O configuration. (i.e. setting relay 49 in Encore I/O configuration will address Multi-track Record Enable relay 1).

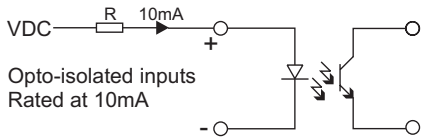
1-24	N/O	COM
	PIN	PIN
Record Enable 1	2	3
Record Enable 2	4	5
Record Enable 3	6	7
Record Enable 4	8	9
Record Enable 5	10	11
Record Enable 6	12	13
Record Enable 7	14	15
Record Enable 8	16	17
Record Enable 9	18	19
Record Enable 10	20	21
Record Enable 11	22	23
Record Enable 12	24	25
Record Enable 13	26	27
Record Enable 14	28	29
Record Enable 15	30	31
Record Enable 16	32	33
Record Enable 17	34	35
Record Enable 18	36	37
Record Enable 19	38	39
Record Enable 20	40	41
Record Enable 21	42	43
Record Enable 22	44	45
Record Enable 23	46	47
Record Enable 24	48	49

25-48	N/O	COM
	PIN	PIN
Record Enable 25	2	3
Record Enable 26	4	5
Record Enable 27	6	7
Record Enable 28	8	9
Record Enable 29	10	11
Record Enable 30	12	13
Record Enable 31	14	15
Record Enable 32	16	17
Record Enable 33	18	19
Record Enable 34	20	21
Record Enable 35	22	23
Record Enable 36	24	25
Record Enable 37	26	27
Record Enable 38	28	29
Record Enable 39	30	31
Record Enable 40	32	33
Record Enable 41	34	35
Record Enable 42	36	37
Record Enable 43	38	39
Record Enable 44	40	41
Record Enable 45	42	43
Record Enable 46	44	45
Record Enable 47	46	47
Record Enable 48	48	49

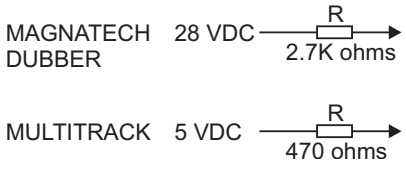
Dubber Tally (Opto-isolated Reader Inputs)

Location: Rear of Recorder Interface Unit

Mating connector required: 50-way D type male



Tallies must be connected via a resistor of appropriate value to limit current to less than 10mA, e.g. if tally signal from machine is active high 5V it would be connected to the + PIN via a 470 ohm resistor. Typical connection schemes:



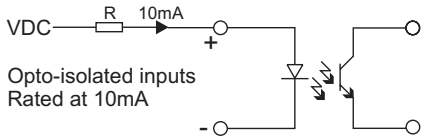
1-24	+	-
	PIN	PIN
Dubber Tally 1	2	3
Dubber Tally 2	4	5
Dubber Tally 3	6	7
Dubber Tally 4	8	9
Dubber Tally 5	10	11
Dubber Tally 6	12	13
Dubber Tally 7	14	15
Dubber Tally 8	16	17
Dubber Tally 9	18	19
Dubber Tally 10	20	21
Dubber Tally 11	22	23
Dubber Tally 12	24	25
Dubber Tally 13	26	27
Dubber Tally 14	28	29
Dubber Tally 15	30	31
Dubber Tally 16	32	33
Dubber Tally 17	34	35
Dubber Tally 18	36	37
Dubber Tally 19	38	39
Dubber Tally 20	40	41
Dubber Tally 21	42	43
Dubber Tally 22	44	45
Dubber Tally 23	46	47
Dubber Tally 24	48	49

25-48	+	-
	PIN	PIN
Dubber Tally 25	2	3
Dubber Tally 26	4	5
Dubber Tally 27	6	7
Dubber Tally 28	8	9
Dubber Tally 29	10	11
Dubber Tally 30	12	13
Dubber Tally 31	14	15
Dubber Tally 32	16	17
Dubber Tally 33	18	19
Dubber Tally 34	20	21
Dubber Tally 35	22	23
Dubber Tally 36	24	25
Dubber Tally 37	26	27
Dubber Tally 38	28	29
Dubber Tally 39	30	31
Dubber Tally 40	32	33
Dubber Tally 41	34	35
Dubber Tally 42	36	37
Dubber Tally 43	38	39
Dubber Tally 44	40	41
Dubber Tally 45	42	43
Dubber Tally 46	44	45
Dubber Tally 47	46	47
Dubber Tally 48	48	49

Record Tally (Opto-isolated Reader Inputs)

Location: Rear of Recorder Interface Unit

Mating connector required: 50-way D type male



Tallies must be connected via a resistor of appropriate value to limit current to less than 10mA, e.g. if tally signal from machine is active high 5V it would be connected to the + PIN via a 470 ohm resistor. Typical connection schemes:

1-24	+	-
	PIN	PIN
Record Tally 1	2	3
Record Tally 2	4	5
Record Tally 3	6	7
Record Tally 4	8	9
Record Tally 5	10	11
Record Tally 6	12	13
Record Tally 7	14	15
Record Tally 8	16	17
Record Tally 9	18	19
Record Tally 10	20	21
Record Tally 11	22	23
Record Tally 12	24	25
Record Tally 13	26	27
Record Tally 14	28	29
Record Tally 15	30	31
Record Tally 16	32	33
Record Tally 17	34	35
Record Tally 18	36	37
Record Tally 19	38	39
Record Tally 20	40	41
Record Tally 21	42	43
Record Tally 22	44	45
Record Tally 23	46	47
Record Tally 24	48	49

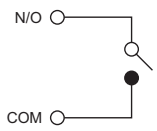
25-48	+	-
	PIN	PIN
Record Tally 25	2	3
Record Tally 26	4	5
Record Tally 27	6	7
Record Tally 28	8	9
Record Tally 29	10	11
Record Tally 30	12	13
Record Tally 31	14	15
Record Tally 32	16	17
Record Tally 33	18	19
Record Tally 34	20	21
Record Tally 35	22	23
Record Tally 36	24	25
Record Tally 37	26	27
Record Tally 38	28	29
Record Tally 39	30	31
Record Tally 40	32	33
Record Tally 41	34	35
Record Tally 42	36	37
Record Tally 43	38	39
Record Tally 44	40	41
Record Tally 45	42	43
Record Tally 46	44	45
Record Tally 47	46	47
Record Tally 48	48	49

Master Enable/Tally

Location: Rear of Recorder Interface Unit - labelled 'Master Enable/Tally'

Mating connector required: 37-way D type male

Master Enable



Normally open relays rated at:

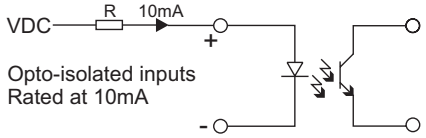
0.5A switching current
10VA max switching power
100V max operating voltage
1A max closed contact rating

Master Rec Enable and Master Play Enable should be connected to Multitrack Master Rec and Master Play if remote punch in/out is required.

Master Enable 1-8	**+**	**-**
	PIN	**PIN**
Master Rec Enable	18	17
Master Play Enable	16	15
Not Allocated	14	13
Not Allocated	12	11
Not Allocated	10	9
Not Allocated	8	7
Not Allocated	6	5
Not Allocated	4	3

Master Tally

Tallies must be connected via a resistor of appropriate value to limit current to less than 10mA, e.g. if tally signal from machine is active high 5V it would be connected to the + PIN via a 470 ohm resistor.

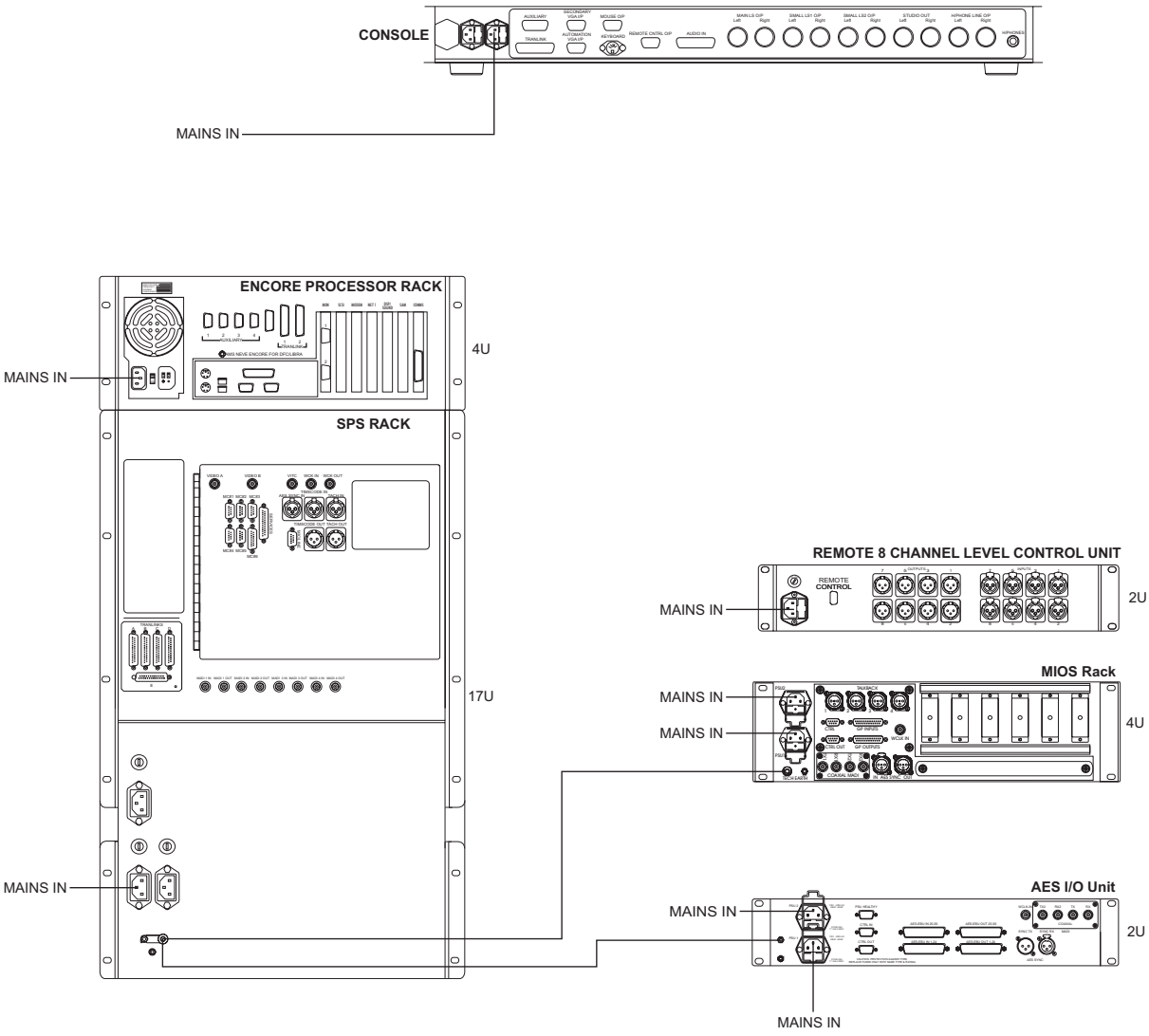


Master Play Tally MUST be activated before MTR Record Enables will function. Master Rec Tally is optional but will allow cancellation of MTR Rec Enables when MTR is taken out of record by another means.

Master Tally 1-8	**+**	**-**
	PIN	**PIN**
Master Play Tally	36	35
Master Rec Tally	34	33
Not Allocated	32	31
Not Allocated	30	29
Not Allocated	28	27
Not Allocated	26	25
Not Allocated	24	23
Not Allocated	22	21

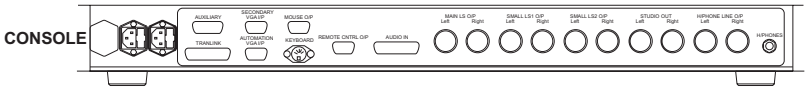
Typical System Interconnects

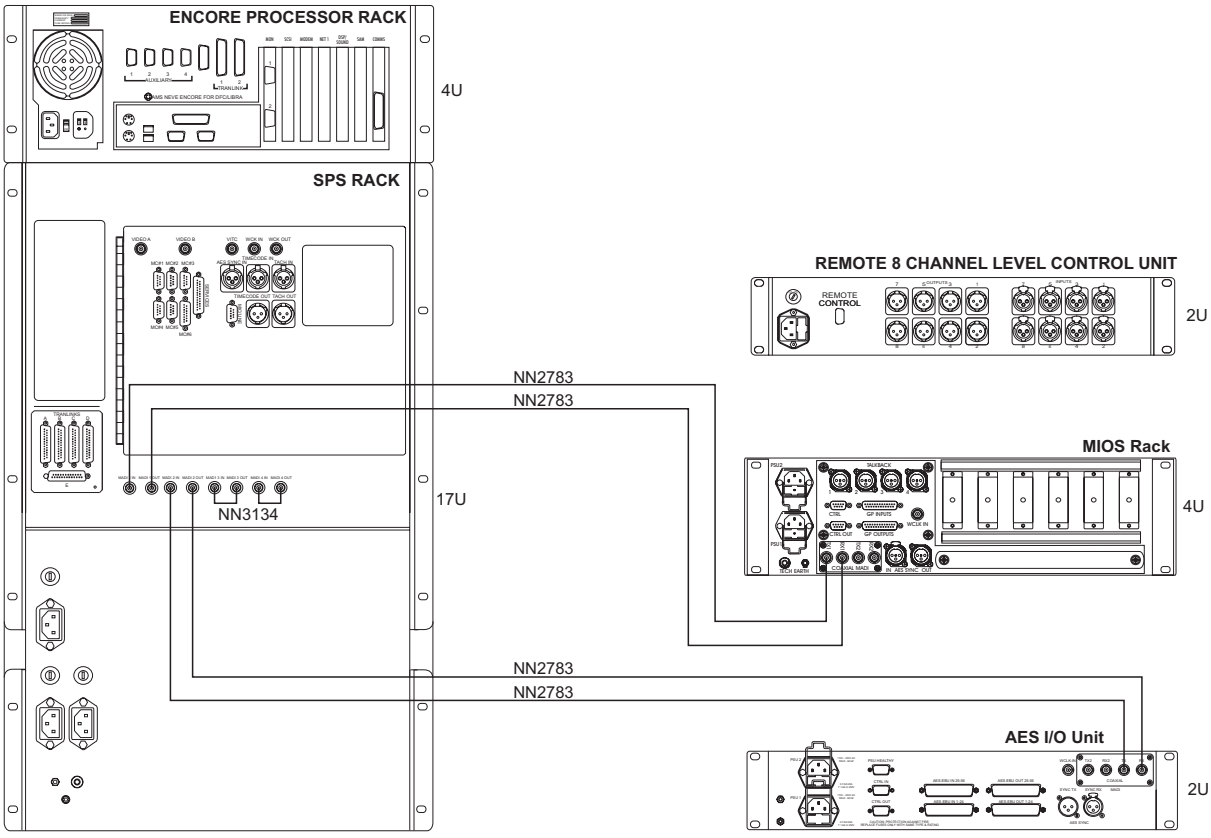
Power and Technical Earth Interconnect



Typical System Interconnects continued

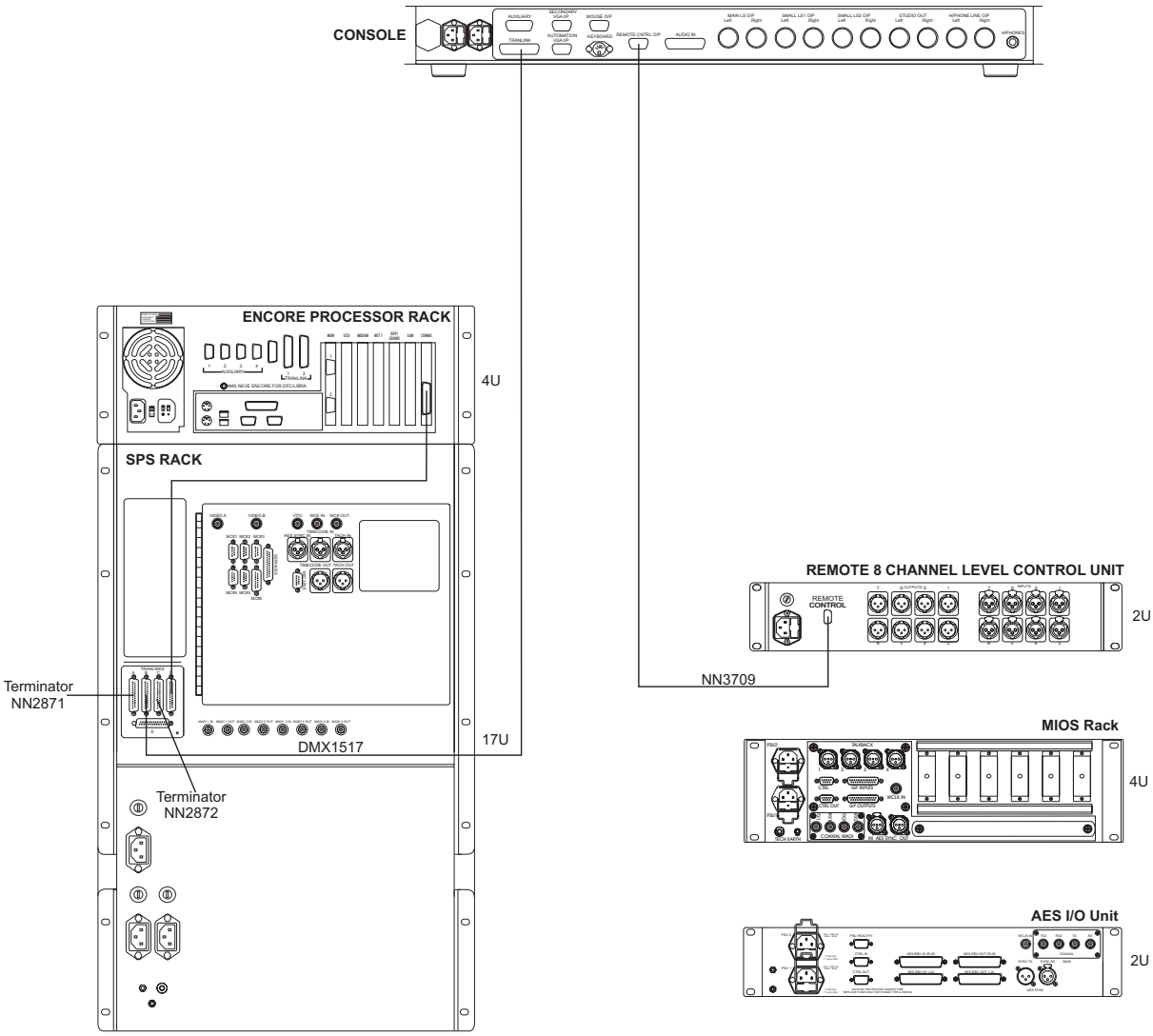
MADI Interconnect





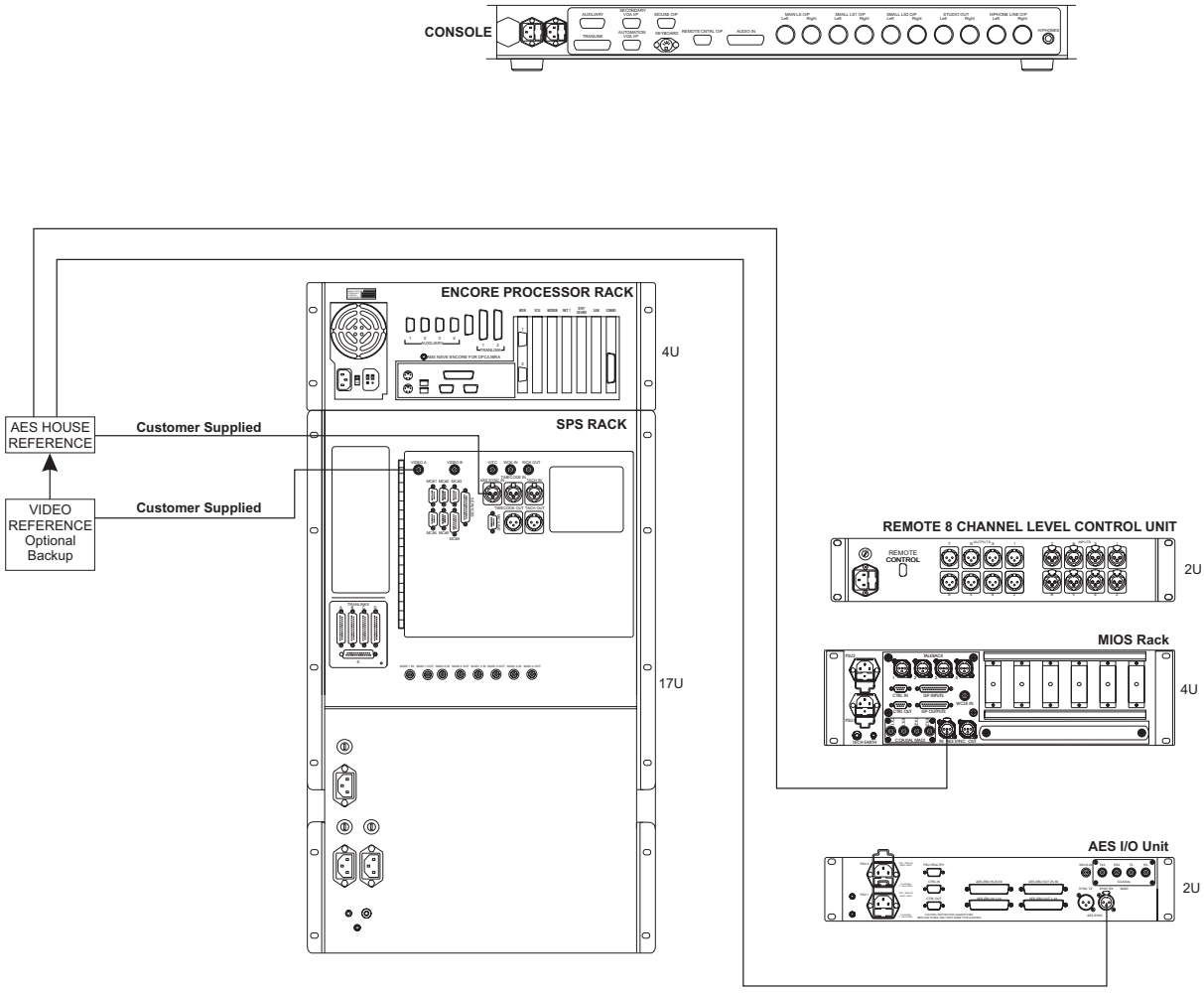
Typical System Interconnects continued

Tranlink Interconnect



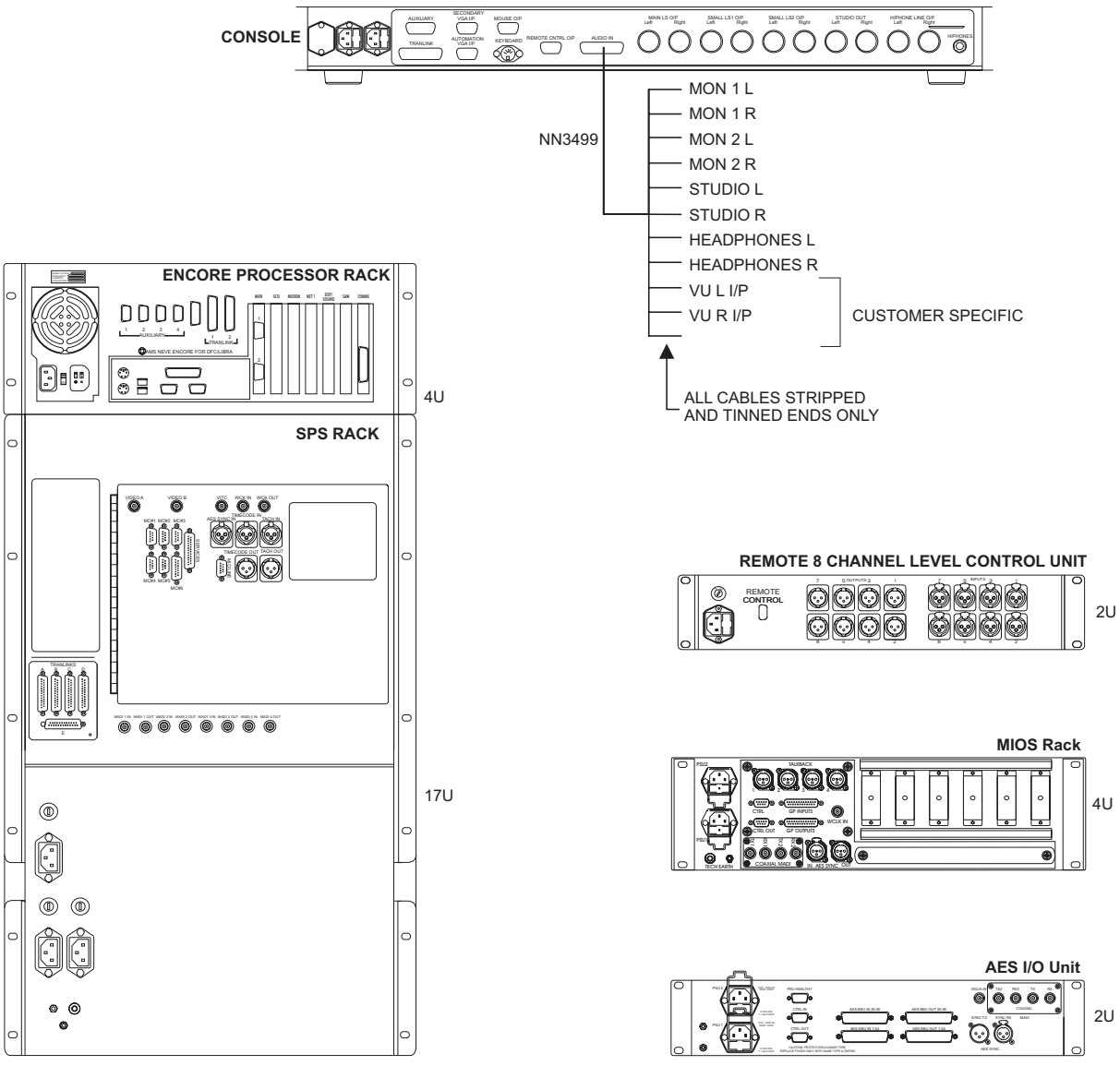
Typical System Interconnects continued

Synchronisation Interconnect



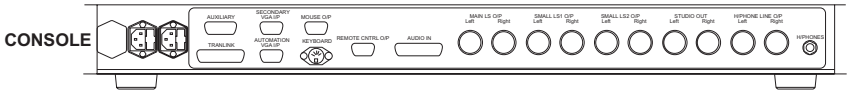
Typical System Interconnects continued

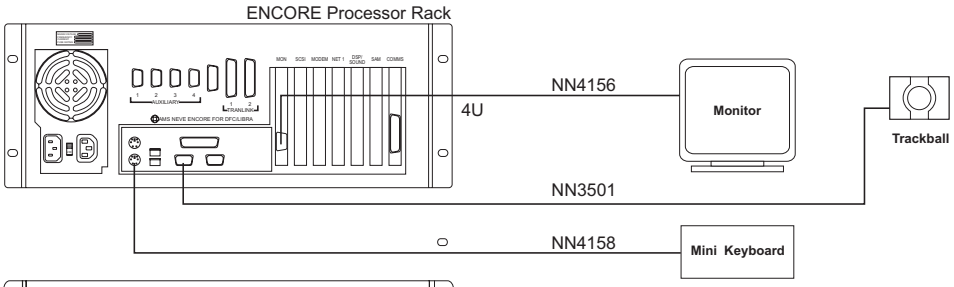
Audio Interconnect

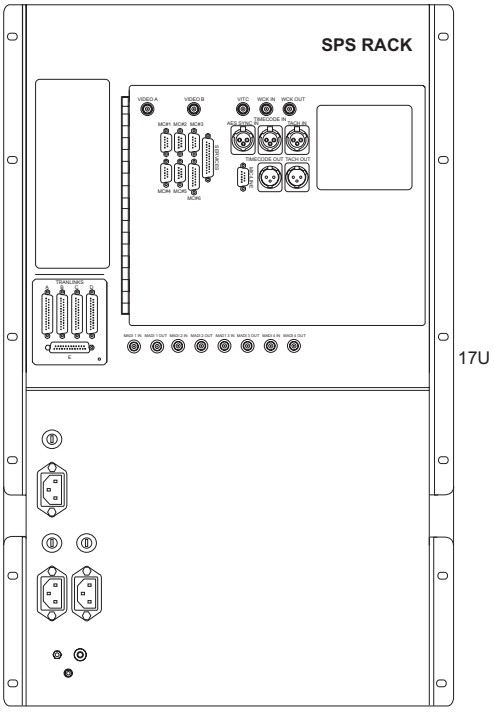


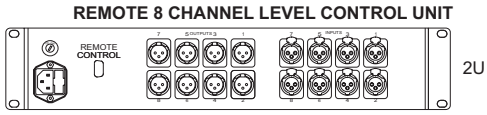
Typical System Interconnects continued

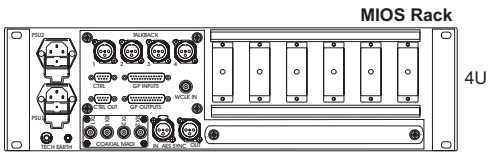
Encore Automation Interconnect

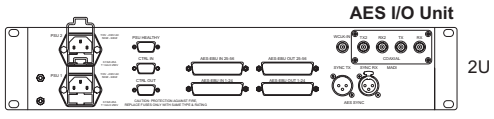












Power Supplies

The power supply modules used in this equipment contain no user serviceable parts. Dangerous voltages and energy levels are present and may be of sufficient magnitude to constitute a risk of electric shock or injury, therefore, in the interests of safety if any fault develops with a power supply module contact your nearest AMS Neve Distributor or AMS Neve Customer Support Department for advice.

The input voltage range and fuse rating are engraved on the equipment label adjacent to the mains input.

Single PSU Assembly

Setup Procedure

➤ Check the power supply voltages are 5.1v & 12.1v at the backplane bus-bars and the disk drive connector before fitting any cards. Adjust supply voltage as necessary.

Dual PSU (redundant) Assembly

Setup Procedure

- Ensure that no cards are plugged in. Remove the "LINK FOR PSU3" jumper on the monitor board.
- Check that there are no short circuits between any of the diode terminals and 0v or chassis. Also check that the diode's mounting plate is isolated from the chassis. Check that all the power wiring to the backplanes and the disk-drive is correct.
- Disconnect the current-share link between the PSUs. Apply power to PSU1 and set the 5v rail to 5.4v and the 12v rail to 12.4v, when measured at the PSU terminals (i.e. before the diodes).
- Remove power from PSU1 and repeat step 3 with PSU2.
- Remove power and plug in all cards.
- Connect the current-share link between the PSUs and apply power to PSU1. Set the voltages to 5.05v * 50mv and 12v * 100mv, when measured at the backplane (i.e. after the diodes).
- Remove power from PSU1 and repeat step 6 with PSU2.
- Apply power to both PSUs and check that the voltages are as set in step 6. If adjustment is required then ensure that both pots. for that rail are trimmed by the same amount in order to maintain the load sharing (N.B. the voltage reading will not be valid until the second pot. has been trimmed, so make only small, equal adjustments).

PSU Monitoring

- Check that the PSU1 and PSU2 green LEDs on the monitor board are lit and that the front panel LED is on. Also, check that pins 1 & 6 (PSU1) and 2 & 7 (PSU2) of the 9-way, D-type connector are short circuit.
- Remove power from PSU1 and check that the corresponding LED extinguishes and the front panel LED flashes roughly twice a second. Also, check that the corresponding pins of the D-type connector are open circuit.
- Re-apply power to PSU1 and repeat step 2 with PSU2. Re-apply power to PSU2 when finished.
- Check each voltage monitor wire from the two PSUs by removing each in turn from the monitor board and checking that the corresponding LED for that PSU extinguishes.

Dual PSU (non-redundant) Assembly

Setup Procedure

- Ensure that no cards are plugged in. Remove the "LINK FOR PSU3" jumper on the monitor board.
- Check that there are no short circuits between any of the diode terminals and 0v or chassis. Check that all the power wiring to the backplanes and the disk-drive is correct.
- Disconnect the current-share link between the PSUs. Apply power to PSU1 and set the 5v rail to 5.1v and the 12v rail to 12.4v, when measured at the PSU terminals.
- Remove power from PSU1 and repeat step 3 with PSU2. Remove power when finished.

✍ *N.B. One PSU may not support the full load depending upon how many cards are fitted, so plug in up to 6 ESPs and the other cards.*

- Connect the current-share link between the PSUs and apply power to PSU1. Set the voltages to 5.05v * 50mv and 12v * 100mv, when measured at the backplane.
- Remove power from PSU1 and repeat step 6 with PSU2. Remove power when finished.
- Plug in all cards and apply power to both PSUs. Check that the voltages are as set in step 6. If adjustment is required then ensure that both pots. for that rail are trimmed by the same amount in order to maintain the load sharing (N.B. the voltage reading will not be valid until the second pot. has been trimmed, so make only small, equal adjustments).

PSU Monitoring

- Check that the PSU1 and PSU2 green LEDs on the monitor board are lit and that the front panel LED is on. Also, check that pins 1 & 6 (PSU1) and 2 & 7 (PSU2) of the 9-way, D-type connector are short circuit.
- Check each voltage monitor wire from the two PSUs by removing each in turn from the monitor board and checking that the corresponding LED for that PSU extinguishes and the front panel LED flashes roughly twice a second. Also, check that the corresponding pins of the D-type connector are open circuit.

Triple PSU (redundant) Assembly

Setup Procedure

➤ Ensure that no cards are plugged in. Fit the "LINK FOR PSU3" jumper on the monitor board.

➤ Check that there are no short circuits between any of the diode terminals and 0v or chassis. Also check that the diode's mounting plate is isolated from the chassis. Check that all the power wiring to the backplanes and the disk-drive is correct.

➤ Disconnect the current-share link between the PSUs. Apply power to PSU1 and set the 5v rail to 5.4v and the 12v rail to 12.4v, when measured at the PSU terminals (i.e. before the diodes).

➤ Remove power from PSU1 and repeat step 3 with PSU2.

➤ Remove power from PSU2 and repeat step 3 with PSU3. Remove power when finished.

✍ *N.B. One PSU may not support the full load depending upon how many cards are fitted, so plug in up to 6 ESPs and the other cards.*

➤ Connect the current-share link between the PSUs and apply power to PSU1. Set the voltages to 5.05v * 50mv and 12v * 100mv, when measured at the backplane (i.e. after the diodes).

➤ Remove power from PSU1 and repeat step 7 with PSU2.

➤ Remove power from PSU2 and repeat step 7 with PSU3. Remove power when finished.

➤ Plug in all cards and apply power to both PSUs. Check that the voltages are as set in step 7. If adjustment is required then ensure that both pots. for that rail are trimmed by the same amount in order to maintain the load sharing (N.B. the voltage reading will not be valid until the second pot. has been trimmed, so make only small, equal adjustments).

PSU Monitoring

➤ Check that the PSU1, PSU2 and PSU3 green LEDs on the monitor board are lit and that the front panel LED is on. Also, check that pins 1 & 6 (PSU1), 2 & 7 (PSU2) and 3 & 8 (PSU3) of the 9-way, D-type connector are short circuit.

➤ Remove power from PSU1 and check that the corresponding LED extinguishes and the front panel LED flashes roughly twice a second. Also, check that the corresponding pins of the D-type connector are open circuit.

➤ Re-apply power to PSU1 and repeat step 2 with PSU2.

➤ Re-apply power to PSU2 and repeat step 2 with PSU3. Re-apply power to PSU3 when finished.

➤ Check each voltage monitor wire from the three PSUs by removing each in turn from the monitor board and checking that the corresponding LED for that PSU extinguishes.

Switch Settings

See separate document.

Part Revision Documents

See separate document.